

Michigan Year 2000 Remediation Methodology

Ladies and Gentlemen:

As we have reported from time to time, the Year 2000 computer problem poses the single most significant challenge ever encountered by the State of Michigan Information Technology Community. With 35 years of design and coding standards that did not include any indication of century, the problem is enormous. Fixing the problem is something that all information technology organizations must do to survive. The problem is universal, pervasive, and relentless. It applies to every organization, and it will not go away.

Earlier this year, a statewide assessment inventoried more than 1,000 applications requiring remediation to be operable in the Year 2000. At that time, it was estimated that more than one million hours of effort would be required to remediate the State's computer applications.

The accompanying Volume of the Michigan Year 2000 Software Remediation Framework has been prepared to provide guidance and instructions for your use in remediating the problem for your respective agency. We believe the Framework will be both informative and useful.

One of the opportunities, which can provide significant benefit to all Michigan agencies, is sharing of information, techniques, experiences, and ideas for effective and efficient remediation. The Year 2000 Project Office will take the lead role in facilitating information exchange and providing access to useful tools and information. I encourage each and every one of you to share your ideas and to provide suggestions on meeting the Year 2000 challenge and on how the Remediation Framework may be made more useful to State agencies and year 2000 Project Team members.

We are in this together, for the duration. Working smart and as a team, we can create a successful result which permits all agencies to continue to provide the services for which they are responsible. Please feel free to contact me if I can be of assistance in this vital initiative.

George Boersma
Chief Information Officer
State of Michigan

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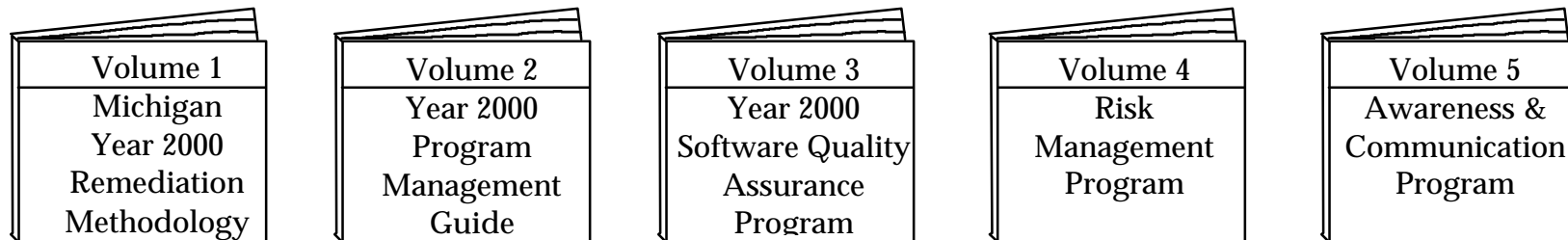
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How to use this Manual

Michigan Year 2000 Remediation Framework



The Year 2000 computer problem presents an extremely difficult challenge. Successfully completing all Year 2000 Remediation activities requires the focus and dedication of a significant portion of available IT resources. To meet this challenge, State Of Michigan (SOM) has established a number of new programs. The Remediation Framework above depicts the new programs that have been initiated. This document is Volume 1 – Michigan Year 2000 Remediation Methodology.

Michigan Year 2000 Remediation Methodology

This section of the Year 2000 Remediation Methodology offers an introduction to the Year 2000 Software Remediation Framework and to how to use this Guide.

Michigan Year 2000 Software Remediation Framework

The Year 2000 Project Office has created a Software Remediation Framework to guide agencies in conducting their respective Year 2000 Projects. The Framework consists of five volumes, as follows:

- Volume 1: Michigan Year 2000 Software Remediation Methodology
- Volume 2: Michigan Year 2000 Program Management Guide
- Volume 3: Michigan Year 2000 Software Quality Assurance Program
- Volume 4: Michigan Year 2000 Risk Management
- Volume 5: Michigan Year 2000 Awareness and Communications Program

A Desk Reference has been created summarizing key information from each volume. These materials should be valuable assets to agencies while conducting the Year 2000 Project, and subsequently will form the foundation for a comprehensive software quality assurance program.

Purpose of this Guide

The Michigan Year 2000 Remediation Methodology provides insights and guidance to agency Year 2000 Project Managers and Coordinators with respect to the overall direction and strategy of the Year 2000 Program. It outlines the activities and tasks relevant to the completion of the Year 2000 Program, and provides information and instructions on reporting to the Department of Management and Budget (DMB) Project Office. This Guide is the foundation of the Michigan Year 2000 Software Remediation Framework

Every agency is different; all materials should be tailored to the specific environment of the agency. The guidance and instructions contained herein are, in most cases, necessarily general as they are intended to be broad enough to be used effectively across all agencies. Agency personnel should carefully select the activities and suggestions applicable to their environments and needs, and tailor those materials for their respective uses.

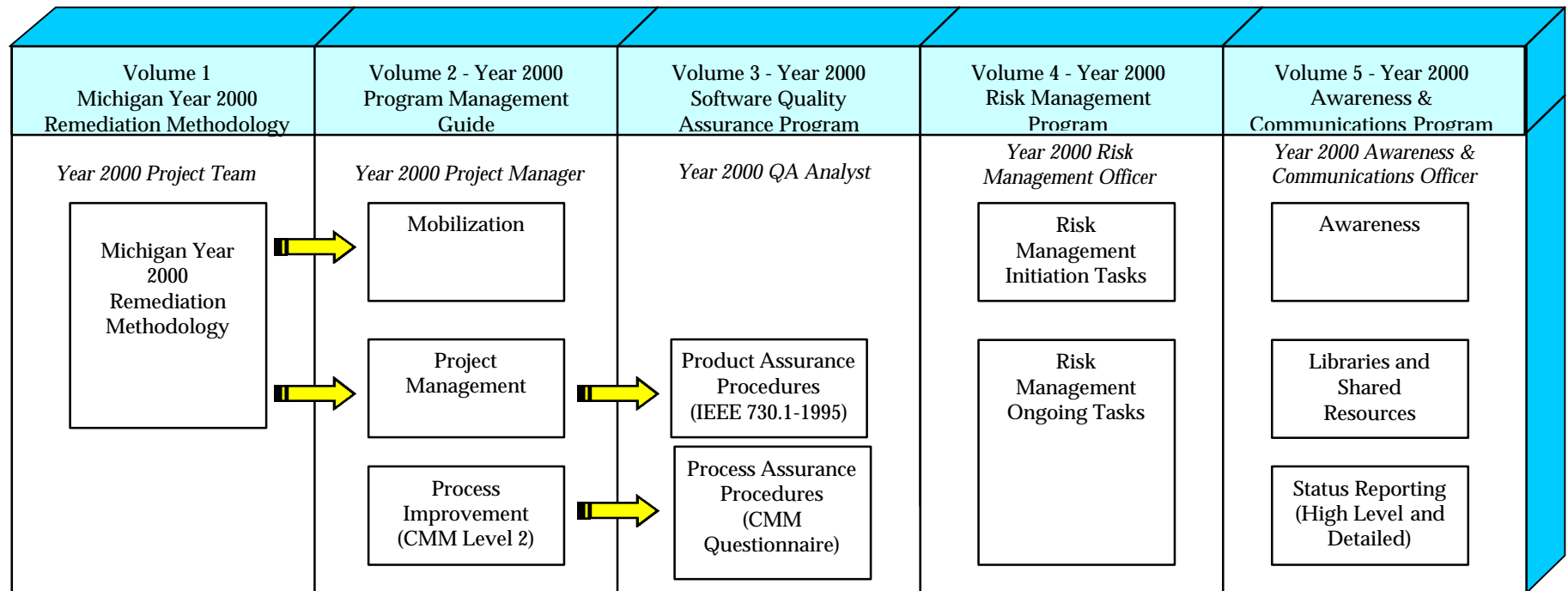
How to use this Guide

This document is presented in loose-leaf notebook format to facilitate updates. Versions are controlled by the dates in the upper right corners. Cross-references to applicable activities in other volumes of the Michigan Year 2000 Remediation Framework are indicated parenthetically (e.g., RM 8.14).

Each Section is numbered individually (e.g., II-1, II-2, II-3, and III-1, III-2, III-3, and so on) to facilitate replacement of pages or sections without a need to republish the entire document. Sections have also been provided to accumulate additional materials distributed during the course of the Year 2000 initiative. Updates will be dated and numbered consecutively. The final page of the Remediation Methodology provides a mechanism for tracking updates to ensure that the respective copy of the methodology has all needed materials.

The Remediation Methodology contains various Appendices with reference materials as well as Practice Aids, including sample reports and forms for use and reference by agency personnel.

The diagram below depicts how the Michigan Year 2000 Remediation Framework Volumes are organized followed by a more detailed description of each volume.



I. Michigan Year 2000 Remediation Methodology

The Year 2000 computer problem poses the single most significant challenge ever encountered by the State of Michigan (SOM) Information Technology (IT) Community. With 35 years of design and coding standards that did not include any indication of representations for century, the problem is enormous. Fixing the problem is something that all information technology organizations must do. The problem is universal, pervasive, and relentless. It applies to every organization, it affects every database and program, and it will not go away. The goal of the Michigan Year 2000 Remediation Methodology is to provide the State with a foundation allowing critical applications to remain operational into the 21st century.

The objectives of the Michigan Year 2000 Remediation Methodology are to create:

- An **Approach** - Define the work break down structure, responsibilities, and deliverables for the work to be performed.
- **Practical Assistance** - Define Procedures and Practice Aids that provide the State of Michigan project teams with additional guidance for remediating the State's application portfolio.

An **Extensible Framework** - Establish a remediation methodological framework from which to develop platform, language, and tool specific detailed instructions.

Year 2000 Program Management Guide

The Year 2000 project scale is significantly larger than all but the largest Information Technology initiatives. For all but a few project managers, the Year 2000 conversion will represent the largest project that they will ever manage. It is therefore critical to define clear, concise, and effective project management processes to ensure successful completion of the States remediation efforts and to reduce the costs and risks of these initiatives.

The objectives of the Year 2000 Program Management Guide are to provide guidelines for:

- **Project Mobilization** - Define the work break down structure, responsibilities, deliverables, and guides required to successfully initiate the State Year 2000 efforts in all agencies.
- **Project Management** - Define the work break down structure, responsibilities, deliverables, and guides required to successfully plan the State Year 2000 efforts in all agencies.
- **Program Management and Reporting** – Define the work breakdown structure, responsibilities, deliverables and guides to successfully manage and report progress for the various facets of the Year 2000 efforts in all agencies.

Year 2000 Software Quality Assurance Program (SQAP)

A major project with the degree of change and the non-negotiable short timeframe to complete Year 2000 modifications such as this has never been attempted. The risk of failure introduced by a change which has either not been completed or has been completed incorrectly is significant. Quality Assurance will play a critical role in reducing the risk and cost of Year 2000 induced failure. Proper quality assurance built into each step of the remediation process will identify problems early, allowing for their correction and for process refinement.

The IEEE 730.1-1995 Software Quality Assurance Plan Standard and CMM have been used as foundations for the Michigan Year 2000 Software Quality Assurance Program. The IEEE 730.1-1995 Software Quality Assurance Plan Standard has been used as the foundation for *Product* Quality Assurance and CMM has been used as the foundation for *Process* Quality Assurance.

The objectives the Year 2000 Software Quality Assurance Program are to support:

- **Product Assurance** - Validate that the Year 2000 products (e.g., implementation strategy plans, detailed assessments, testing strategies, testing plans, test results, implementation plans, converted source code, and converted databases) have been completed correctly. The Product Assurance component of the SQAP is founded upon the IEEE 730.1-1995

Software Quality Assurance Plan Standard. The agency's internal QA function has the responsibility for conducting Product Assurance.

- **Process Assurance** - Validate that the agencies are effectively applying the Michigan Year 2000 Remediation Methodology. If an agency elects to use a methodology other than the Michigan Year 2000 Remediation Methodology, they must demonstrate that the alternative methodology or set of processes meet or exceed the Michigan Year 2000 Remediation Methodology requirements. Process Quality Assurance is founded upon agencies achieving CMM Level two. The CMM questionnaire is used to evaluate agency processes, to identify process deficiencies, and as a basis for defining process improvements.
- **Progress Assessment** – Review the States progress towards becoming Year 2000 operable. Once a quarter the Michigan Year 2000 Project Office Quality Assurance Specialists conduct a review by completing jointly with agency management and quality assurance staff a Year 2000 Milestone Assessment and a Year 2000 Critical Success Factor Assessment. The results of the assessment are used for quarterly statewide reporting, to identify issues, and to improve the remediation processes.

Year 2000 Risk Management Program

While the goal is to have every needed application working in the new century, we must prioritize our work so as to ensure that the mission critical applications are identified and tracked intensively until they are deemed compliant. This work will be completed through the Year 2000 Risk Management Program.

The objectives of the Risk Management Program are to establish:

- **Risk Management Initiation Tasks** - Identify key risks, specify business impact of each risk, specify a mitigation strategy for each risk, and specify early warning symptoms for each risk. The risk management program will also establish a monitoring mechanism for early warning symptoms, identify containment strategies, contingency plans and immediate action steps, define a triage planning process, and perform quality assurance procedures.

- **Risk Management On-going Tasks** - Conduct monthly risk management assessment, monitor risk metrics, perform mitigation actions, as necessary, perform risk containment strategies, perform contingency plans, as needed, perform triage process implementation as necessary, and perform quality assurance procedures.

Year 2000 Awareness and Communications Program

This is a comprehensive plan to ensure that the information needs of all Year 2000 stakeholders are accommodated.

The objectives of the Awareness and Communication Program are to develop and support:

- **Awareness** - Keep senior leadership and members of the legislature informed on Year 2000 progress, funding and risks. Keep stakeholders informed of Year 2000 issues and efforts. Develop Year 2000 awareness materials, and organize seminars for continuing awareness.
- **Libraries and Shared Resources** - Organize and maintain reference materials, implement procedures for best practice information, and develop procedures to exchange information with agencies. Publish information on contact list, tools and techniques, pre-qualified and selected vendors, Year 2000 compliance standards, IT contracts, non-IT contracts, non-IT warranty language, and links to specific Year 2000 sites.
- **Status Reporting** (High Level and Detailed) - Prepare periodic Reports on attainment of project milestones, planning modifications, task deviations, and other occurrences. The desired reporting period will be monthly for critical applications and quarterly for all other applications.

This manual, the Michigan Year 2000 Remediation Methodology is organized into fourteen sections, three Appendices, and various attachments.

Sections I – II describe the Michigan Year 2000 Project Office, an overview of the Michigan Year 2000 Remediation Methodology and the roles of the project participants.

- I. Michigan Year 2000 Remediation Methodology Overview
- II. Roles

Sections III – XII describe Activities 1 – 10 of the Michigan Year 2000 Remediation Methodology

- III. Activity 1 - Statewide Mobilization
- IV. Activity 2 - Agency Mobilization
- V. Activity 3 - Detailed Assessment
- VI. Activity 4 - Code Modification
- VII. Activity 5 - Validation (Unit and System Testing)
- VIII. Activity 6 - Implementation
- IX. Activity 7 - Program Management
- X. Activity 8 - Quality Assurance
- XI. Activity 9 - Risk Management
- XII. Activity 10 - Awareness and Communication

Section XIII lists deliverables by activity and task

- XIII. Deliverables by Activity and Task

The Michigan Year 2000 Remediation Methodology is to be used by all State agencies as a guide and checklist for the activities and tasks that need to be performed. The Methodology has been designed to document a high level approach for remediating multiple languages and platforms. Detailed procedures and guidance for specific languages and platforms will need to be further developed by the agency teams in order to meet the Project Office reporting requirements. The Procedures and Practice Aids section of this manual provide this type of detailed, platform specific support that agencies may find useful.

“Procedures and Practice Aids” are methodology extensions and will be developed on an as needed basis. An index for and a copy of the Procedures and Practice Aids have been placed in the back of the Methodology. It is anticipated that more Procedures and Practice Aids will be developed and added over time by the Software Factory, Remediation Vendors, individual agencies, and by the Michigan Year 2000 Project Office.

The **Procedures and Practice Aids** section contains the following types of material:

Standards	Required policy directives.
Guidelines	Supplemental explanations that provide the agencies with additional assistance in completing an activity.
Practice Aids	Suggested format for completing a specific well-defined, platform-specific task (e.g., Microsoft Word Template; Microsoft Excel Spreadsheet; or a Graphic). Several of the current examples are IBM specific and intended to be reference only. The practice aids section is dynamic and as examples from other platforms and languages are submitted to and approved by Project Office, they will be added to this document.

Some commonly used terms within the Year 2000 industry are also used throughout this document. In order to go forward with common understandings, they are defined here and again in the Glossary.

Remediate/Remediation	The term remediate and remediation are used to describe all of the activities required to enable the State of Michigan’s application systems to be Year 2000 operable. Renovation, Replacement, Rewrite, Retirement, and Verification are Remediation Strategies.
Renovate/Renovating/Renovation	A year 2000 conversion strategy in which code that is not year 2000 compliant is located, modified, and verified to ensure year 2000 compliance.
Replace	Substitution of a non-compliant existing program or application with a version of the software that is year 2000 compliant.

Rewrite

In a limited number of instances, the functionality provided by an application may not meet the needs of the State at all, and the agency may elect to rewrite the application. This is a risky strategy because of the inherent problems associated with development projects.

Retire

A conversion strategy in which resources that are not year 2000 compliant and are no longer deemed necessary, are systematically and permanently removed from the production environment.

Verify for Compliance

If an application has already been determined to be compliant, the State of Michigan will need to test the application to document compliance.

Michigan Year 2000 Remediation Methodology

I. Michigan Year 2000 Remediation Methodology Overview

The Michigan Year 2000 Remediation Methodology is part of an overall effort to implement a Year 2000 Software Quality Assurance Program (SQAP). The SQAP has two components: a process quality assurance component and a product quality assurance component. To utilize the SQAP successfully, a methodology must first be established from which to benchmark progress. This document describes and documents the Year 2000 Remediation Methodology for Michigan.

The Michigan Year 2000 Remediation Methodology was developed from:

- “Year 2000 Methodology and Approach” from Spectrum Consulting Group, Inc.
- “GAO Remediation Methodology” from the Federal Government’s General Accounting Office.
- ITAA2000 Certification Guidelines.
- Capability Maturity Model from Carnegie Melon University.
- Other additional reference material.

The objective of the Methodology is to create a common structure and understanding of the work to be performed in terms of:

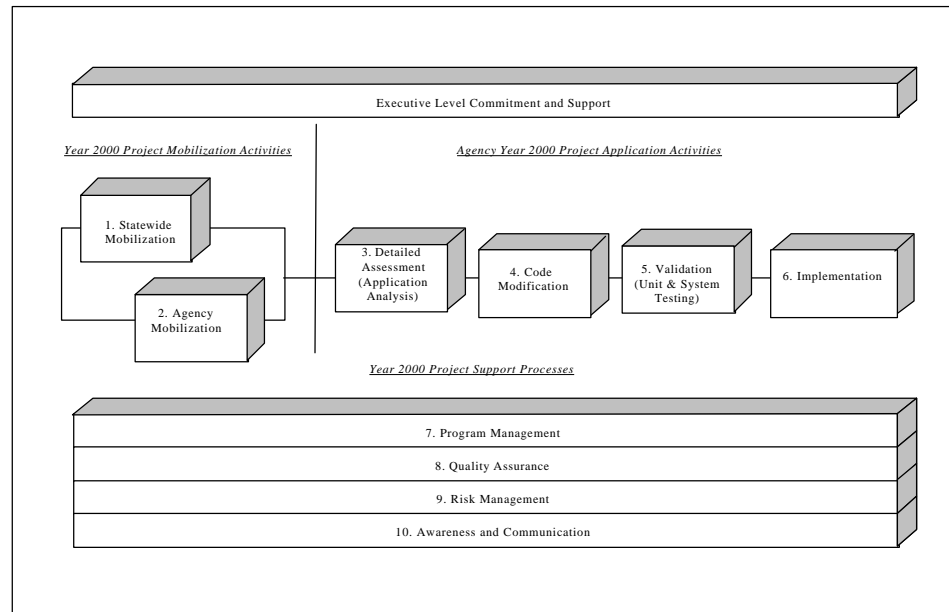
- Responsibilities.
- Roles.
- Work break down structure.
- Activity and task sequencing.
- Deliverables.

Creating a common structure and understanding reduces the time required to initiate and complete the work, reduces the cost of the resources required, allows for an efficient means to benchmark the status of an agency's Year 2000 remediation progress, and enhances the quality of the work performed.

Flexible use of this Methodology is required. Many agencies have already begun Year 2000 remediation efforts. For these agencies, the Michigan Year 2000 Project Office anticipates comparing the initiatives that are already underway against the Michigan Year 2000 Remediation Methodology to ensure the quality of each remediation process. When an agency can demonstrate that an alternative approach produces comparable or better results, they can receive a waiver from the requirement to use this Methodology from the Year 2000 Project Office. For those agencies that have only recently begun or for those that are still in the preparation stages, this Methodology should be used to establish an agency level, year 2000 Project Office and for conducting Year 2000 remediation efforts.

The diagram below depicts a high level graphical view of the Michigan Year 2000 Remediation Methodology.

Michigan Year 2000 Remediation Methodology



Appendix A of this Volume contains a larger; more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. Activities 1 –2 are mobilization activities that apply to both the Michigan Year 2000 Project Office and the Agency level Year 2000 Project Offices. Activities 3 – 6 represent iterative Year 2000 application/compliance unit dependent activities. Activities 7 – 10 are project support processes conducted by both the Michigan Year 2000 Project Office on a statewide basis and the individual agency Year 2000 Project Offices with a focus on agency level activities.

The Year 2000 computer problem requires outstanding dedicated effort across all SOM agencies. This Methodology provides uniform guidance to assist agencies in the planning needed to perform the required remediation work in an efficient manner. The Methodology is deliberately concise to reduce the paperwork component to the minimum level necessary to plan, manage and communicate a successful and timely result.

Following is a brief narrative description of each activity depicted on page I-3:

Executive Level Commitment and Support

Although not considered one of the ten activities within the Michigan Year 2000 Remediation Methodology, Executive Level commitment and support is a critical component for the success of all Year 2000 initiatives. Many Executives are not aware of this problem, or they have a minimal understanding of the challenges and issues that will be encountered. Proper Executive Level commitment and support is imperative to the success of any Year 2000 Remediation effort. The Michigan Year 2000 Remediation Methodology has been customized to seek an early exchange of information between Executive Management and the rest of the Project Team. Application of this methodology will facilitate knowledge transfer and will require a high degree of Executive Level commitment and support.

Year 2000 Project Mobilization Activities

The Project Mobilization Activities are those activities required to mobilize SOM resources to address the Year 2000 challenge.

1. Statewide Mobilization

Mobilizing the SOM IT Community to face the Year 2000 represents a significant challenge. Commercially available Year 2000 Methodologies have not yet addressed these unique challenges. The Michigan Year 2000 Remediation Methodology has been tailored to respond effectively to Michigan's unique blend of Year 2000 issues, as well as to incorporate all of the typical activities and tasks which will be required by all organizations.

Some of the key goals for developing a Statewide Mobilization program are to identify clearly the responsibilities of the Michigan Year 2000 Project Office and to identify centralized business functions that may be performed at the Statewide level in a more timely and cost effective manner. The Michigan Year 2000 Project Office is also responsible for conducting a Statewide Year 2000 Assessment to determine the magnitude of the problem and to seek necessary expenditure authority.

The Michigan Year 2000 Project Office has identified seven key responsibilities. Michigan Year 2000 Project Office has the responsibility for:

- Planning and Oversight.
- Financial Oversight.
- Agency Monitoring, Statewide Progress Reporting, and Process Certification.
- Infrastructure Readiness.
- Consulting, and Research & Development.
- Vendor Management and arrangements for a “Software Factory.”
- Agency and External Partner Interface Coordination.

2. Agency Mobilization

The objective of this activity is to mobilize each agency for the purpose of remediating all applications and a goal of completing the Year 2000 remediation work, for all criticality level 1 and criticality level 2 applications as defined in the Statewide Year 2000 Assessment performed by Keane, Inc., by December, 1998. This timeline will allow sufficient time for comprehensive and effective testing and any necessary corrections. It is critical, across a diverse organization such as the SOM, to establish a proper project direction that will allow each agency to be successful.

Several SOM agencies have already begun many of the tasks represented in the agency Mobilization activity. Each agency has been asked to complete a detailed Year 2000 Assessment Survey documenting the impacts that the Year 2000 will have on the organization. Each agency has also been asked to assemble a Year 2000 Implementation Strategy Plan. Agency Mobilization is complicated by several factors including:

- Some of the agencies are not aware of the severity of the problem.
- Certain of the agencies are small and may not have a large I/T staff.
- Many of the agencies used programming languages which have become obsolete or obscure and are no longer easily supported. Knowledgeable staff for these systems are, in many cases, no longer with the Agency or no longer employed by the SOM.
- The decentralized nature of the SOM's IT Community has allowed each Agency to make development decisions (i.e., choice of languages used) independently. As a result, there are a significant number of unusual languages currently being supported.
- Some of the agencies have systems that are highly decentralized and not linked – many small PC networks, with a minimal number of workstations (1 – 6) located in numerous locations all over the State.

Agency Year 2000 Project Application Activities

The desired structure of a Year 2000 Remediation project is very similar to that of a Standard Systems Development Life Cycle project.

Michigan Year 2000 Remediation Methodology

Statewide and Agency Mobilization (Activity 1&2)*
Detailed Assessment (Activity 3)
Code Modification (Activity 4)
Validation – Unit, System & Acceptance Testing (Activity 5)
Implementation (Activity 6)

Standard Systems Development Life Cycle

Requirements Design
Detailed Design
Code Construction
Validation
Implementation

* The Statewide Year 2000 Assessment was performed as a part of Activity 1 – Statewide Mobilization

Within this methodology, the objective of the Statewide Year 2000 Assessment (Michigan Year 2000 Remediation Methodology Activity 1; Task 1.4) is to develop a high-level view and approximate quantification of the Year 2000 remediation work required. The objective of the Requirements Design phase of a Standard Systems Development Life Cycle is to develop a high level view of a standard development project. In the Statewide Year 2000 Assessment, surveys are used to collect high-level application system information (e.g., What applications is an Agency running? From what languages were those systems constructed? How many components are active, by language, within an application system within an agency?). This information is then used to estimate the size of the Year 2000 remediation effort.

The objective of the Detailed Assessment activity (Michigan Year 2000 Remediation Methodology Activity 3) is to develop a lower level, more detailed and application/compliance unit specific view of the work that is required. This assessment will provide a detailed inventory of components requiring change by conducting a Detailed Assessment using automated software assessment products. Likewise, the objective of the Detailed Design phase of the Standard Systems Development Life Cycle is to develop a more detailed view of the work required. The remaining activities can be compared in a like manner.

Based on the number of application systems or compliance units that are identified for each agency, activities 3 – 6 are reiterated, accordingly.

3. Detailed Assessment

During the Detailed Assessment activity, software analysts and subject matter experts carefully determine the components that belong to each system, identifying all active components, obsolete source code, and executable load modules for which the source is no longer available. Using this information, an inventory of the application system/compliance unit is compiled. Once the inventory has been completed, a detailed assessment is performed to identify programs and files with dependent date processing. The result of this effort is a detailed application system/compliance unit project plan for the Year 2000 Remediation Project that defines the schedule, effort, skill types and number of resources required for each work step. This detailed application system/compliance unit plan is a sub-plan of the overall project plan that is used to manage the work effort for each application system through the remediation process. The overall project plan is built from these sub-plans and will contain all plans and overall project schedule, detailing effort and resources for the complete agency Year 2000 remediation project. Without the detailed assessment, this agency level information may be based on less reliable estimates.

4. Code Modification

The SOM's application systems use a number of different programming languages. A portion of the portfolio, primarily COBOL applications, may be renovated using highly automated processes. However, some of the Year 2000 remediation will be performed manually, particularly in the case of languages which have been less frequently used, and for languages for which there are no automated Year 2000 renovation tools. The modified source code components from either the automated Software Factory approach or the manual renovation approach are checked for syntax errors and prepared for Unit Testing. The approach for source code renovation will include the modification of program, copy member/macro, screen components, invocation languages, and transaction processing table modification.

During this activity, common copy members/macros/includes are modified before source programs. After copy members/macros/includes and source programs are modified, related screen code is changed to support the processing of expanded date fields.

The detailed change specifications from Activity 3 will be reviewed to confirm which files to change, what data conversion routines to write, and what file bridges to build.

5. Validation (Unit, System and Acceptance Testing)

Each agency is responsible for:

- Establishing a set of Baseline Test data for unit, system and acceptance testing.
- Executing a controlled test (original source).
- Executing modified source components and comparing the results against Baseline Test results.

This test data will contain 19XX dates as well as 20xx dates for century/year in date fields. The results from the test comparisons will be used to identify errors and issues created during data and source renovations so that continuous improvement modifications may be made to improve the quality and efficiency of the processes.

6. Implementation

During the Implementation activity, agencies will promote Year 2000 compliant components that have been approved into production status and perform related data conversions. In addition, new data bridges will be implemented, and information concerning changes in user/operations instructions will be provided. The Michigan Year 2000 Project Office will assist in the coordination of interface testing and changes.

Post-implementation support is provided to assist production maintenance and operations personnel in the resolution of production problems associated with Year 2000 renovation changes.

Year 2000 Project Support Activities

In addition to the Project Initiation, Mobilization, and Application Activities, there are a number of project support processes that are required to complete the Year 2000 remediation project. These activities are underlying processes, a series of ongoing activities that end only when the entire Year 2000 remediation initiative has been completed.

7. Program Management

The objective of the Program Management Activity is to manage, at both the Statewide and agency levels, all of the different Year 2000 remediation initiatives, which are occurring simultaneously. A Year 2000 Progress Reporting System (formerly referred to as a Year 2000 Monitoring and Tracking system) has been designed for entering, collecting, and reporting project status at both the Statewide and agency level. Key elements of Program Management will be timely status reporting, timely issue identification and resolution, and resource management.

8. Quality Assurance

The objective of the Quality Assurance Activity is to monitor the quality of the Year 2000 Remediation effort, its processes, and to measure the quality of the work products produced. Agencies have the responsibility for ensuring Product Quality Assurance. The Michigan Year 2000 Project Office will provide overall guidance and leadership in oversight of Process Quality Assurance.

9. Risk Management

Year 2000 projects are fraught with risk—a high degree of complexity, large scope, tight time frames, a variety of technologies and platforms, implications both to and from other entities, and competing initiatives. Unless properly

managed, any of these risks could cause the project to fail. In the case of Year 2000 projects, failure can be disastrous. Risk management includes the following steps:

- Identification and assessment of probability, impact and external influence.
- Prevention techniques and mitigation plans.
- Early warning indicators, monitoring mechanisms, and containment strategies.
- Contingency and triage planning.
- Ongoing risk assessment and monitoring.

The Michigan Year 2000 Project Office will provide detailed guidance on Risk Management for use by agencies.

10. Awareness and Communication

The Year 2000 Remediation effort requires a large expenditure of people and other valuable resources with little added value. It is likely to detract from other urgently needed development efforts that are already underway. Senior officials, already frustrated with the perceived slow pace of delivering information technology solutions for agency objectives, could see this as a failure by information technology managers and go hunting for someone to blame. Therefore, public and vocal sponsorship from the highest office in the organization is critical. Keeping this official aware of the issues and knowledgeable of the status of the year 2000 effort is crucial to keeping executive level support and commitment.

The agency Director must take a strong leadership role in mobilizing all the required resources to effectively address this issue. All other projects must be prevented from taking precedence. It is equally as important to keep all other agency stakeholders informed and aware of Year 2000 issues, this project, and the project team's progress toward completing required remediation activities. An ongoing series of activities to promote and maintain awareness of the Year 2000 problem, as well as a solid commitment to the project, is required.

II. Roles

The following paragraphs describe the various roles that are required to conduct SOM Year 2000 Remediation efforts. These positions are general, and must be applied appropriately within the Civil Service positions established for each agency. In many cases, an individual may be assigned to more than one role. The roles are:

Michigan Year 2000 Project Office

CIO *State of Michigan Chief Information Officer*

- Provide overall direction for and lead the Statewide Year 2000 initiative;
- Maintain relationships with and obtain sponsorship from senior executives within DMB and across State Government;
- Ensure that the Year 2000 Project has adequate funding and management support; and
- Report to the cabinet and legislature on Year 2000 progress and status.

P1 *Michigan Year 2000 Project Office Director*

- Direct the functions of the Year 2000 Project Office;
- Prepare Statewide Year 2000 project status reports, including metrics and statistics;
- Oversee allocation and disbursement of funds in support of Agency efforts to remediate application code;
- Identify needs and coordinate availability of common Year 2000 facilities;
- Oversee resolution of Year 2000 vendor performance issues;

- Maintain relationships with the Attorney General and Office of the Auditor General on Year 2000 legal and audit issues; and
- Research and coordinate resolution of issues.

P2 Technology and Project Management

- Develop Year 2000 Compliance Standards;
- Review and evaluate Agency Year 2000 plans;
- Coordinate remediation of external interfaces;
- Oversee Agency remediation efforts;
- Coordinate the implementation and ongoing operation of Year 2000 facilities; and
- Provide guidance to Agencies on various project management and technology issues.

P3 Financial and *Risk Management Officer*

- Allocate DMB appropriated moneys among agencies and systems;
- Develop and maintain a system to track expenditures of all Year 2000 funds appropriated to DMB;
- Establish procedures and monitor Agency reports of actual and planned expenditures related to reported progress;

- Process reimbursements for approved Year 2000 expenditures;
- Prepare and distribute financial and risk management reports;
- Create and administer a statewide risk management program.

P4 *Awareness and Communication Coordinator*

- Create and distribute materials to promote Statewide awareness of Year 2000 activities:
 - Obtain and distribute anecdotal information on successes and failures as a basis of knowledge transfer;
 - Research issues and provide information on tools and techniques; and
 - Establish and maintain a “web site” of practical information and forms for use by Agencies.
- Coordinate ongoing awareness activities;
- Maintain database of best practices information;
- Maintain the Year 2000 Progress Reporting system; and
- Process Year 2000 FOIA requests.

P5 *Quality Assurance Specialist*

- Review and monitor Agency project plans and updates, as well as status reports;

- Understand and track Agency timelines and mission critical applications;
- Conduct software process assessment at selected Agencies to determine the state of Agency readiness and degree of risk; and
- Identify potential risks and recommend solutions.

P6 *Project Office Legal Issues Coordinator*

- Provide information and support to agency staff who are involved in efforts to document the State's efforts to become Year 2000 operable;
- Coordinate obtaining Year 2000 specific contract terms and conditions standard language for contracts;
- Conduct legal issue research for the State.

Other roles that may need to be filled in a centralized capacity by the State:

P7 *Infrastructure Coordinator* – Responsible for developing and implementing a plan to replace all SOM infrastructure components which are not Year 2000 Compliant (e.g., hardware, operating system software, various control devices – such as elevator controls).

P8 *Special Projects Manager* – Responsible for managing special projects.

P9 *Special Projects Programmer/Analyst* - Responsible for designing, developing and testing special project activities.

- P10 *Project Office Business Insurance Issues Coordinator* – Responsible for providing information and support to agency staff who are supporting the business insurance and liability concerns of the Year 2000 challenge.
- OAG *Office of the Auditor General (OAG)* – Although not a direct function of the Michigan Year 2000 Project Office, the OAG will work closely with the Michigan Year 2000 Project Office in conducting Quality Assurance and Year 2000 Certification.
- MIPC *Michigan Information Processing Center (MIPC)* – MIPC representatives will work closely with the Michigan Year 2000 Project Office on issues of scanning, testing and other mainframe operational issues.

Year 2000 Software Factory (Administered by the Michigan Information Processing Center)

- F1 *Factory Manager* – Responsible for all Software Factory operations including site selection, build out, staffing, tool selection, assessment, renovation, scheduling, vendor management and coordination with Michigan State Agencies.
- F2 *Assessment Analyst* – Responsible for conducting the Detailed Assessment by system within an agency and for identifying which systems are aggregated together as a Compliance Unit as described in Activity 3. A Compliance Unit consists of a collection of one or more related systems that will be implemented as a unit (i.e., a group of closely related dependent applications, e.g., General Ledger and Accounts Payable).
- F3 *Renovation Analyst* – Responsible for conducting the Code Modification by Compliance Unit within an agency as described in Activity 4.
- F4 *Platform Specialist* – Responsible for providing platform level subject matter expertise to the Software Factory and agency Project Teams.
- F5 *Tools Specialist* – Responsible for providing assessment, renovation and testing tool subject matter expertise to the Project Teams.
- F6 *Agency Liaison* – Responsible for coordinating the work being performed in the factory for an agency and obtaining application specific information from agency personnel for the factories use.

Note: The roles played within the Software Factory can be supported by Michigan Staff within a Michigan Software Factory, by outside remediation vendor contractors, or by agency internal staff depending upon the decisions made on the Software Factory and whether or not the platform/language is supported by the Software Factory.

Agency Remediation Team

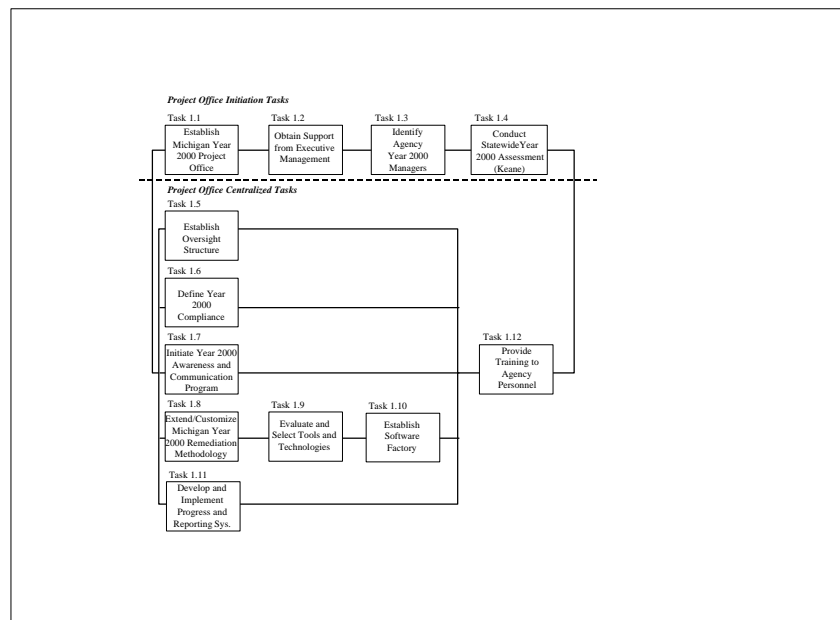
- D1 *Business Owner* – agency Director responsible for the operations of an agency; for identifying the business impact of failure; for prioritizing the Year 2000 remediation efforts; and business continuation planning.
- D1A *Agency Chief Information Officer* - Responsible for all IT activities within an agency.
- D2 *Year 2000 Project Financial Officer* – Responsible for tracking and monitoring the Year 2000 financial expenditures and applying to the Michigan Year 2000 Project Office for reimbursement of Year 2000 related costs.
- D3 *Agency Year 2000 Project Manager* – Responsible for all Year 2000 initiatives within an agency.
- D4 *Assessment/Remediation Coordinator* – Responsible for coordinating the Detailed Assessment (Activity 3) and the Code Modification (Activity 4); for scheduling remediation efforts; and for building the remediation teams.
- D5 *Testing Coordinator* – Responsible for coordinating the testing efforts, including test scheduling; acquisition or development of test data; coordination of shared resources; capacity planning; resource management; and testing tools acquisition.
- D6 *Implementation Coordinator* – Responsible for the implementation of each remediated application system/compliance unit including development of application level implementation and fallback plans; resource scheduling; capacity planning; risk management; and implementation prioritization.
- D7 *Interface Coordinator* – Responsible for coordinating shared data between application systems/compliance unit and external agents (e.g., the federal government and other State agencies) including identification of interfaces; coordination of bridge building; the coordination of bridge removal; and coordination of conversion efforts for shared data.
- D8 *Programmer/Analyst* – Responsible for assessment, renovation, testing and other assigned tasks.

- D9 *System Tester* – Responsible for developing and conducting a systems test to validate that a Compliance Unit is ready for acceptance testing.
- D10 *Acceptance Tester* - Responsible for developing and conducting an acceptance test to validate that a Compliance Unit is ready for implementation.
- D11 *Quality Assurance Analyst* – Responsible for conducting process and product level quality assurance reviews as defined in the Software Quality Assurance Program (Volume 3).
- D12 *Documentation Analyst* – Responsible for changing the operations and design documentation of a system as required by existing standards.
- D13 *Infrastructure Analyst* – Responsible for implementing a plan to replace all SOM infrastructure components which are not Year 2000 Compliant (e.g., hardware, operating system software, and various control devices – such as elevator controls).
- D14 *Awareness and Communications Coordinator* – Responsible for coordinating and dispensing information about the Year 2000 challenge, conducting Year 2000 research, and making educational presentations to agency staff and stakeholders.
- D15 *Agency Legal Issues Coordinator* – Responsible for providing information and support to agency staff who are involved in efforts supporting due diligence and contract review, as well as conducting legal issue research for the agency.
- D16 *Agency Insurance Issues Coordinator* – Responsible for providing information and support to agency staff who are supporting the business insurance and liability concerns of the Year 2000 challenge.

III. Activity 1 - Statewide Mobilization

The objective of the Statewide Mobilization activity is to initiate all of the centralized efforts required for the SOM to successfully remediate the State's computer applications.

Activity 1 –Statewide Mobilization



Appendix A of this Volume contains a larger; more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. The following pages describe the tasks in Activity 1 – State Mobilization, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task.

Michigan Year 2000 Remediation Methodology

1.1

Activity: Statewide Mobilization

Task: Establish Michigan Year 2000 Project Office

Description

Remediating all of SOM's application systems statewide is a monumental task. Establishing an effective Michigan Year 2000 Project Office staff with a cooperative relationship with SOM agencies is critical. In an environment with a decentralized IT Community, it is important to maximize the effectiveness of the Michigan Year 2000 Project Office and to minimize the number of redundant activities that must be performed statewide. A key element of establishing the Michigan Year 2000 Project Office will be to identify those functions that may be performed most economically if done centrally. SOM has already identified the Software Factory, Program Management, Risk Management and Quality Assurance as activities that should be centrally arranged by or performed within the Michigan Year 2000 Project Office.

The objectives of Task 1.1 Establish Year 2000 Michigan Year 2000 Project Office are:

- Establish the physical office.
- Identify the personnel resources for the Michigan Year 2000 Project Office.
- Identify business partners to work with SOM to complete the Year 2000 Project.
- Define the Vision for the Michigan Year 2000 Project Office – the Charter, Goals, Objectives, Roles, and Responsibilities.

Deliverables

- Project Office Vision
- Project Office Workplan and Budget

Responsible Party

- State of Michigan Chief Information Officer (CIO)
- Michigan Year 2000 Project Office Director (P1)
- Project Office Staff (P*)

Michigan Year 2000 Remediation Methodology

1.2

Activity: Statewide Mobilization

Task: Obtain Support from Executive Management

Description

The objective of Task 1.2 is to obtain and formalize statewide and agency level executive management support through various awareness programs, issuance of Year 2000 policy directives, and the Year 2000 Program Charter. The Michigan Year 2000 Project Office will conduct executive level briefings periodically to seek continued support throughout the duration of all Year 2000 remediation efforts.

Without support from executive management, agency information resource managers will not be able to mobilize adequate resources to successfully remediate agency application systems and to interact with other organizations and interfaced data sources. Failure to garner executive level support may hinder the ability to keep SOM residents safe from harm, as well as the ability to successfully provide other critical State services.

An integral component of executive level support is recognition on their part that it may be necessary to delay, curtail, or cancel completely other initiatives, both IT projects and introduction of new programs, until the Year 2000 computer problem is fully addressed.

Deliverables

- Executive Management Support Plan

Responsible Party

- State of Michigan Chief Information Officer (CIO)
- Michigan Year 2000 Project Office Director (P1)
- Year 2000 Awareness and Communication Coordinator. (P4)
- Business Owner (D1)
- Agency Chief Information Officer (D1A)

Michigan Year 2000 Remediation Methodology

1.3

Activity: Statewide Mobilization

Task: Identify Agency Year 2000 Project Managers

Description

The objective of Task 1.3 is for each agency to appoint an agency Year 2000 Project Manager, and to establish an agency level Year 2000 Project Office to manage and coordinate the enterprise's Year 2000 Project activities. Solutions to the Year 2000 computer problem extend beyond simple software renovation, hardware upgrades, and database restructuring. The problem – and the solutions – involve a wide range of disciplines.

On the surface, the Year 2000 computer problem appears to be simple. However, the real challenge results from the size and volume of changes that will be occurring simultaneously. The Year 2000 problem is similar to the challenges faced by Armed Services Logistics organizations – thousands of components which all must be at the right place at the right time.

Deliverables

- Year 2000 Resource Directory

Responsible Party

- Michigan Year 2000 Project Office Director (P1)
- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

1.4

Activity: Statewide Mobilization

Task: Conduct Statewide Year 2000 Assessment (Keane)

Description

The objective of Task 1.4 is to develop an enterprise-wide inventory of information systems and their components that will provide the necessary foundation for Year 2000 program planning. The goal of this task is to produce an enterprise-level assessment of the effort, impact and issues in developing and executing the Year 2000 remediation effort. The statewide Year 2000 Assessment provides the SOM with information from which to prepare a budget and plan resource allocation.

Keane, Inc. was selected to conduct the statewide Year 2000 Assessment and completed their assessment in June of 1997. Surveys were circulated to each agency to collect information about the number of programs, the number of lines of code (LOC), an estimate of the number of components affected, interfaces, and business impact of failure, by language. It is extremely important that the statewide Year 2000 Assessment Surveys are given the proper level of attention. The quality of the planning information is only as good as the amount and quality of effort expended by the subject matter experts completing the surveys.

The Year 2000 Impact Assessment completed in June of 1997 contained a statewide Year 2000 Assessment and twenty-four (24) Agency Year 2000 Impact Assessments.

Deliverables

- Year 2000 Assessment Report (Keane, Inc.)

Responsible Party

- Michigan Year 2000 Project Office Director (P1)
- Agency Chief Information Officer (D1A)
- Year 2000 Project Office Staff (P*)
- Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology	
1.5	Activity: Statewide Mobilization
	Task: Establish Oversight Structure
Description	
<p>The objective of Task 1.5 is to establish an Oversight Committee is to provide the Michigan Year 2000 Project Office with agency-based insight for developing standards, policies, and practices; and for resolving inter-agency business priority conflicts.</p> <p>SOM has currently identified three Year 2000 groups/committees who are helping to establish and refine policies and practices for the Year 2000 Initiative. They are:</p> <ul style="list-style-type: none"> ▪ IMPACT – CIO's from the various agencies represented on the Year 2000 Task Force. ▪ Agency Year 2000 Project Managers. ▪ Year 2000 Special Interest Group (SIG) that may be created to address specific issues. 	
Deliverables	Responsible Party
<ul style="list-style-type: none"> • Year 2000 Project Organization Structure 	<ul style="list-style-type: none"> ▪ Michigan Year 2000 Project Office Director (P1) ▪ Technology and Project Manager ▪ Business Owner (D1) ▪ Agency Chief Information Officer (D1A) ▪ Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology	
1.6	Activity: Statewide Mobilization
	Task: Define Year 2000 Compliance
Description	
<p>The objective of Task 1.6 is to define/refine Year 2000 compliance criteria. As the Year 2000 Project progresses, there is a need to determine whether or not a given source component or remediated application system is Year 2000 compliant.</p> <p>The SOM has begun work on both Year 2000 Compliance and Certification. This information will be used as a beginning point to define Year 2000 Compliance.</p> <p>The Michigan Year 2000 Project Office shall initiate discussions with the Office of the Auditor General (OAG) to determine if there are any special criteria that the OAG will require for certification.</p>	
Deliverables	Responsible Party
<ul style="list-style-type: none"> Year 2000 Compliance Criteria (see DMB Procedure 1310.30) 	<ul style="list-style-type: none"> Michigan Year 2000 Project Office Director (P1) Technology and Project Manager (P2) Office of the Auditor General (OAG)

Michigan Year 2000 Remediation Methodology

1.7

Activity: Statewide Mobilization

Task: Initiate Year 2000 Awareness and Communication Program

Description

The objective of Task 1.7 is to identify the methods to achieve a high degree of statewide Year 2000 awareness, and to initiate a Year 2000 Awareness and Communication program. A Year 2000 awareness campaign is an important first step to get the attention of executive management and line staff about the potential impact of the Year 2000 problem on the agency's operations.

Awareness and Communications Objectives:

- Serve as point of contact for answering questions on statewide Year 2000 efforts.
- Keep legislature and senior leadership informed on Year 2000 progress, funding and risks.
- Serve as an information clearinghouse for Year 2000 reference materials and "Best Practice" information.
- Keep local governments and other trading partners informed on Year 2000 issues.

Methods of Communication:

- Agency progress and status reports.
- Web Site.
- Distribution lists.
- Newsletter.

<i>Michigan Year 2000 Remediation Methodology</i>	
1.7 (continued)	Activity: Statewide Mobilization
	Task: Initiate Year 2000 Awareness and Communication Program
<i>Description</i>	
<i>Deliverables</i>	<i>Responsible Party</i>
<ul style="list-style-type: none"> Michigan Year 2000 Remediation Framework – Awareness & Communication Program (Volume 5) 	<ul style="list-style-type: none"> Michigan Year 2000 Project Office Director (P1) Year 2000 Awareness and Communications Coordinator (P4) Agency Chief Information Officer (D1A) Awareness and Communications Coordinator (D14)

Michigan Year 2000 Remediation Methodology

1.8

Activity: Statewide Mobilization

Task: Extend/Customize Michigan Year 2000 Remediation Methodology

Description

The objective of Task 1.8 is to extend and customize the comprehensive Michigan Year 2000 Remediation Methodology as appropriate so that it can be used to remediate SOM's application systems. The Michigan Year 2000 Remediation Methodology is used by all State agencies as a guide for the activities and tasks that need to be performed to remediate an application system. The Methodology has been designed to document a high level approach for remediating multiple languages and platforms. Agency staff must tailor the required activities to their specific circumstances.

It is anticipated that more detailed guidance to the specifics of an individual language and platform will most likely be required. These Methodology extensions are referred to as "Practice Aids" and will be developed at a later date on an as needed basis.

The Michigan Year 2000 Remediation Methodology forms the base upon which the Software Quality Assurance Program (SQAP) program is built.

Deliverables

- Extended and Customized Michigan Year 2000 Remediation Methodology to fit Individual agency Needs
- Procedures and Practice Aids

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Michigan Year 2000 Project Office Director (P1)
- Technology and Project Manager (P2)
- Agency Chief Information Officer (D1A)
- MIPC Representative (MIPC)

Michigan Year 2000 Remediation Methodology

1.9

Activity: Statewide Mobilization

Task: Evaluate and Select Tools and Technologies

Description

The objective of Task 1.9 is to develop and execute a process to evaluate and select tools for remediating the SOM application portfolio. Developing a process first is critical to addressing the diverse needs of SOM because of the varied languages and platforms supported. Specifically, a tool evaluation process is developed which identifies the tool classes and types required in each activity to support Year 2000 remediation activities.

A graphical representation of the flow of source code and data through the remediation process is then developed with annotations noting where in the process each tool class and type is used. The next step is to identify for each platform and language which tools may be used for each tool class and type. From this assessment, gaps are identified that are manually addressed. Niches are identified, where multiple products are evaluated to identify a "Best Practice."

The Year 2000 product marketplace is extremely dynamic. Experience has shown that organizations are better off to stay away from completely new products or start-ups to avoid reliability concerns. The practice aids section of this manual contains an example of a tools evaluation and selection that was performed for a commercial business. The example is for a business that used IBM mainframes, Tandem equipment, and PCs. Although the data in the evaluation is less pertinent to the State of Michigan, the structure of the evaluation, tool categories and tool types are valid.

Deliverables

- Year 2000 Tools Selection Classes and Types
- Year 2000 Selection Criteria
- List of Year 2000 software products by platform and language
- Recommended Year 2000 Tool purchases

Responsible Party

- Technology and Project Manager (P2)
- Factory Manager (F1)
- Tools Specialist (F5)
- MIPC Representative (MIPC)

Michigan Year 2000 Remediation Methodology

1.10

Activity: Statewide Mobilization

Task: Establish Software Factory

Description

The objective of Task 1.10 is to establish a Software Factory or identify vendors who have already established a software factory that SOM may use. One of the initial steps is to develop a Vision for the Software Factory, and then assess the speed with which the vision can be implemented. Ramp up speed is critical. If the Software Factory cannot be constructed quickly, it is imperative to quickly select vendor partners who will provide these services. Establishing a Software Factory is a major undertaking. Here is a list of some of the questions that need answering as the SOM considers this important decision:

- Should SOM build two factories: one for Unisys A Series, and one for Bull?
- Should the Software Factory support more than COBOL, and if it does, what other languages?
- Should the Software Factory provide both assessment and renovation services?
- How should the Software Factory interface with each agency?
- Should the Software Factory be implemented as an in-house or vendor service?
- Should all applications be run through the Software Factory assessment service?
- Should the Software Factory be operated from under DMB, OCAT or MIPC?
- What tools should be purchased and made available as a part of the Software Factory?

It is important to integrate the Software Factory efforts and processes with those of the Michigan Year 2000 Remediation Methodology, in order to present a clear vision of the work to be performed to the agencies.

Deliverables

- Software Factory Implementation Plan
- Software Factory Implementation ITB
- Software Factory Procedure Manual

Responsible Party

- Factory Manager (F1)
- Platform Specialist (F4)
- Tools Specialist (F5)
- Michigan Year 2000 Project Office Director (P1)
- Technology and Project Manager (P2)
- MIPC Representative (MIPC)

Michigan Year 2000 Remediation Methodology

1.11

Activity: Statewide Mobilization

Task: Develop and Implement Michigan Year 2000 Progress Reporting System
(Formerly the Year 2000 Monitoring and Tracking System)

Description

The objective of Task 1.11 is to develop the Year 2000 Progress Reporting System to collect data from the agencies so that the Michigan Year 2000 Project Office can monitor and report on SOM Year 2000 project initiatives. Supported functions of the Year 2000 Progress Reporting system include:

- Agency Maintenance.
- Application Maintenance.
- Various status reporting functions.

One of the goals of this task will be to leverage this effort by using some of the information from Keane's Year 2000 Assessment database.

Deliverables

- Year 2000 Progress Reporting System Design (in Microsoft Access)
- Year 2000 Progress Reporting System
- Year 2000 Progress Reporting System Training
- Year 2000 Progress Reporting System Documentation and User Guides

Responsible Party

- Technology and Project Manager (P2)
- Special Projects Manager (P8)
- Special Projects Programmer/Analyst (P9)

Michigan Year 2000 Remediation Methodology	
1.12	Activity: Statewide Mobilization
	Task: Provide Training to Agency Personnel
Description	
<p>As Year 2000 initiatives progress, there is a need to develop and conduct agency training on a number of different Year 2000 related topics. Since the primary business of the agency is not to address the Year 2000 problem, the agency IT staff may not have the base of knowledge required to solve the Year 2000 challenge. Therefore, there is a critical need to acquire or develop training to provide agency IT employees with a solid understanding of the challenges that they face.</p> <p>Key task objectives:</p> <ul style="list-style-type: none"> ▪ Establish statewide training objectives. ▪ Select/Develop training materials. ▪ Schedule training. ▪ Conduct training. ▪ Monitor training effectiveness. <p>The three deliverables listed below represent a sample of, but certainly not all of, the training that is required.</p>	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Michigan Year 2000 Remediation Methodology Training ▪ Michigan Year 2000 Project Reporting System Training ▪ Software Factory Training ▪ Other Training as required 	<ul style="list-style-type: none"> ▪ Technology and Project Manager (P2) ▪ Year 2000 Project Office Staff (P*) ▪ Special Projects Manager (P8) ▪ Special Projects Programmer/Analyst (P9)

IV. Activity 2 - Agency Mobilization

The objective of the Agency Mobilization activity is to prepare each agency to successfully remediate their computer applications. Much of what would be completed under Activity 2 – Agency Mobilization is included in the Agency Year 2000 Implementation Strategy Plan (ISP) submitted by each agency to the Year 2000 Project Office at DMB, and by the work completed during the Statewide Year 2000 Assessment conducted by Keane, Inc.

However, the Michigan Year 2000 Remediation Methodology includes all tasks and steps represented by the work in the Statewide Year 2000 Assessment and the Year 2000 Implementation Strategy Plans. These activities and tasks were represented because not all Agencies have completed this work, or they have completed the work with less than the accuracy that is required to successfully remediate their application portfolio.

Specifically, much of the work to establish implementation priorities is not yet complete. During the Statewide Year 2000 Assessment, Keane, Inc. and the Agencies gathered and recorded information about the “criticality” and “affect of failure” (referred to in the Methodology as the Business Impact of Failure). This information needs to be reviewed during Activity 2 in order to establish a remediation sequencing (the order in which the applications will be renovated).

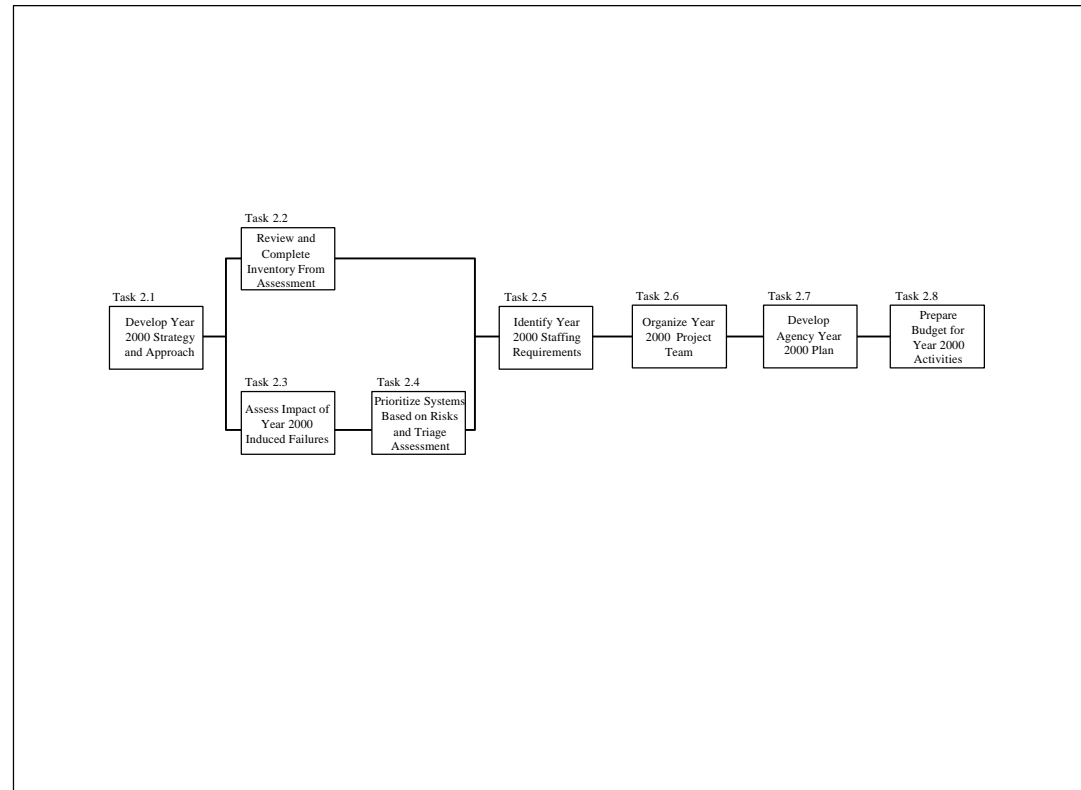
Criticality is defined as follows:

- 1 Agency can't perform daily functions without application
- 2 Agency can function without application for a short time (1 to 4 weeks)
- 3 Agency can function without application for several months
- 4 Agency can function totally without application
- 5 Other

DMB issued a request (as a part of the Year 2000 Compliance Standard) for each agency to develop a Year 2000 Implementation Strategy Plan. The Memorandum requested that each agency “Assess each computer system’s importance to the organization and begin setting priorities and weeding out computer applications that no longer add value.” Clearly, the Agencies have begun work in Activity 2. DMB is working with each agency to determine how much of Activity 2 has been completed and will help the Agencies develop a plan to complete Activity 2.

The diagram below depicts the relationship between the tasks in Activity 2:

Activity 2 –Agency Mobilization



Appendix A of this Volume contains a larger more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. The following pages describe the tasks in Activity 2 – Agency Mobilization, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task.

Michigan Year 2000 Remediation Methodology

2.1

Activity: Agency Mobilization

Task: Develop Year 2000 Strategy and Approach

Description

The objective of Task 2.1 is for each agency to develop a high-level Year 2000 Strategy and Approach for remediation of each computer application system and to provide the agency's executive management with a roadmap for achieving Year 2000 compliance. The strategy should include:

- Objectives and scope of the agency's strategic initiatives.
- Opportunities for collateral improvements (system consolidation, platform change, implementation of SQAP).
- Key Year 2000 issues:
 - Response to existing business demand.
 - Identification of active application source code.
 - Assessment of available application experts within the agency.
- Program management structure.
- Program metrics.
- Reporting requirements.

Deliverables

Responsible Party

- Year 2000 Strategy and Approach

- Agency Chief Information Officer (D1A)
- Agency Year 2000 Project Manager (D3)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

2.2

Activity: Agency Mobilization

Task: Review and Complete Inventory from Assessment

Description

The objective of Task 2.2 is to review and verify the information gathered during the Statewide Year 2000 Assessment assembled by Keane, Inc. In many instances, the study was found to be incomplete or inaccurate. The information should be evaluated to determine its degree of accuracy and level of completion.

Deliverables

- Updated Year 2000 Assessment Report

Responsible Party

- Quality Assurance Analyst (D11)
- Other Project Office Staff Members as Required (P*)

Michigan Year 2000 Remediation Methodology

2.3

Activity: Agency Mobilization

Task: Assess Impact of Year 2000 Induced Failures

Description

The objective of Task 2.3 is to identify the business impact of Year 2000 induced failures. It is important for every information technology organization to understand and manage risk, especially on large projects that are pervasive in their scope and penetration into the enterprise. Edward Yourdon, in his book *Rise and Resurrection of the American Programmer*, states that “on large projects, a healthy respect for significant risks is often the difference between success and failure; and on the large projects, the financial consequences – as well as the legal, social, and political consequences – can be devastating.”

This information will be used as input for prioritizing the SOM's applications to limit the SOM's exposure. One of the goals of this task will be to leverage this effort by using some of the information from Keane's Year 2000 Assessment Database. The practice aids in the back of this manual contain a sample of a customized Application Criticality Report available from Keane's Year 2000 Assessment Database. Sample report formats may be located in the Procedures and Practice Aids section of this Methodology.

Deliverables

- Year 2000 Induced Failure Report

Responsible Party

- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

2.4

Activity: Agency Mobilization

Task: Prioritize Systems Based on Risks and Triage Assessment (Preliminary)

Description

The objective of Task 2.4 is to prioritize an agency's application systems. An agency must determine priorities for system renovation and replacement by ranking each application system based on key factors, such as business impact, operational impact, interface requirements and the anticipated failure date. Applications, databases, archives, and interfaces that cannot be renovated because of resource and time constraints are also identified.

Deliverables

- Application Systems Inventory in Implementation Priority Sequence Report

Responsible Party

- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Year 2000 Project Financial Officer (D2)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

2.5

Activity: Agency Mobilization

Task: Identify Year 2000 Staffing Requirements

Description

The objective of Task 2.5 is to identify the staffing requirements for each agency and to evaluate the ability of each agency to properly staff the Year 2000 project. Retirements, downsizing, and staff attrition have effected the entire industry. Many organizations will not have the required staff to support renovating their application systems.

A critical Year 2000 constraint is the number of application subject matter and technical experts available. Retaining and applying these resources is critical to the success of the SOM's Year 2000 initiatives. In most organizations, these resources will be asked to support on-going maintenance, future enhancements, and the Year 2000 remediation effort, all simultaneously.

Once the skills and number of resources have been identified, the load that will be placed upon these critical resources is evaluated to determine whether or not the critical application systems experts and technical experts will be over used. Many organizations have recognized this severe constraint and have shut down all other development activity, with the exception of emergency maintenance, thus freeing up critical resources to support their Year 2000 initiatives.

Deliverables

- Resource Utilization Plan

Responsible Party

- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Year 2000 Project Financial Officer (D2)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

2.6

Activity: Agency Mobilization

Task: Organize Year 2000 Project Team

Description

The objective of Task 2.6 is to establish a project team organization for each agency. The project team organization will be influenced by consideration of:

- Number and variety of different platforms in use.
- Variety of different programming languages in use.
- Skills of the project team.
- The amount of vendor assistance required.
- The availability of functional expertise.
- Availability of legal advice.

Deliverables

- Project Team Organization Chart
- Project Team Roles and Responsibilities

Responsible Party

- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

2.7

Activity: Agency Mobilization

Task: Develop Agency Year 2000 Plan

Description

The objective of Task 2.7 is to develop a Year 2000 Project Plan. Each agency has the final responsibility for achieving Year 2000 compliance and for avoiding service disruption. The Project Plan will include but not be limited to:

- An Agency Year 2000 Project Vision.
- Schedules for all agency level Year 2000 activities.
- A complete prioritized list of application systems and their disposition (remediate/replace/rewrite/compliant/na).
- A list of languages and platforms supported with an approach defined for supporting the remediation.
- A resource usage strategy.
- An assessment of the Impact of Year 2000 induced failures.
- A list of tools selected in Task 1.9 for use within the agency.
- A testing strategy.
- A vendor partnership strategy.
- A list of affected software/hardware/network/operating system/other inventory.
- A description of the impact on information technology operations.
- The agency-level Awareness and Communication Plan.

Michigan Year 2000 Remediation Methodology

2.7
(continued)

Activity: Agency Mobilization

Task: Develop Agency Year 2000 Plan

Description

Deliverables

- Year 2000 Implementation Strategy Plan

Responsible Party

- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

2.8

Activity: Agency Mobilization

Task: Prepare Budget for Year 2000 Activities

Description

The objective of Task 2.8 is to develop estimates of the number of resources and costs required to remediate/replace/rewrite each agency application system for budgeting and planning purposes. The estimating model should contain the following information:

- | | |
|---|---|
| ▪ Application Systems Metrics | ⌘ Date of First Impact |
| ▪ Business Priority (1-5 as defined in the Keane Study) | ⌘ Work Required (Remediate and Test; Test Only) |
| ▪ Business Impact of Failure (1-Low, 2-Medium, 3-High) | ⌘ Estimated Level of Effort (Hours) |
| ▪ Disposition (Remediate, Replace, Retire, n/a) | ⌘ Estimated Cost (dollars) |
| ▪ Date Sensitivity (1-Low, 2-Medium, 3-High) | |

The Estimating spreadsheet should be sorted in order of Business Impact of Failure within Business Priority order. All application systems should be included. An application system may be left off the list because it is scheduled for replacement, and then, it is never replaced. If a complete assessment has been performed on all code, the Michigan Year 2000 Project Office will be able to respond to business change quickly. If the assessment and estimates have not been built, a business change will impact the schedule. The report should be segmented with the highest priority systems sorted to the top and the lower priority systems, which may never be remediated, sorted to the bottom. Triage – the act of limiting the number of systems remediated – therefore becomes a matter of drawing a line somewhere in the list, with those systems above the line being remediated, and those below the line not being remediated. Sample report formats may be located in the Procedures and Practice Aids section of this Methodology.

Deliverables

Responsible Party

- Year 2000 Project Plan Cost and Resource Estimates

- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Year 2000 Project Financial Officer (D2)
- Agency Year 2000 Project Manager (D3)

V. Activity 3 - Detailed Assessment

The objective of the Detailed Assessment activity is to conduct a detailed assessment of the SOM's application portfolio identifying the specific date-dependent components requiring remediation.

As the following table indicates, a Year 2000 Remediation project is very similar to a Standard Systems Development Life Cycle project.

Michigan Year 2000 Remediation Methodology

Statewide and Agency Mobilization (Activity 1&2)*
Detailed Assessment (Activity 3)
Code Modification (Activity 4)
Validation – Unit, System & Acceptance Testing (Activity 5)
Implementation (Activity 6)

Standard Systems Development Life Cycle

Requirements Design
Detailed Design
Code Construction
Validation
Implementation

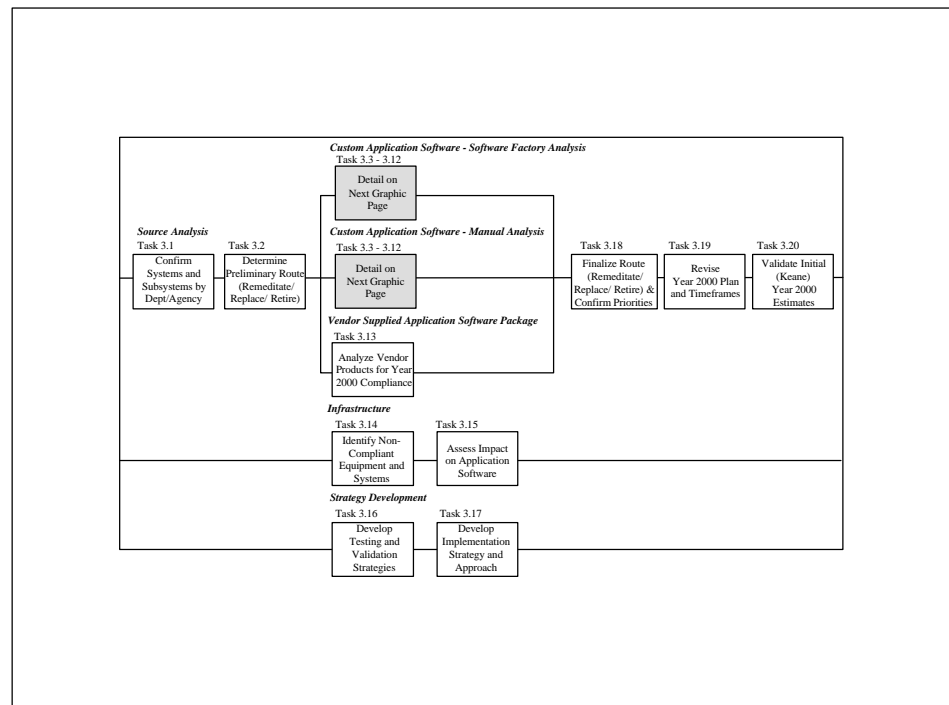
* The Statewide Year 2000 Assessment is performed as a part of Activity 1 – Statewide Mobilization

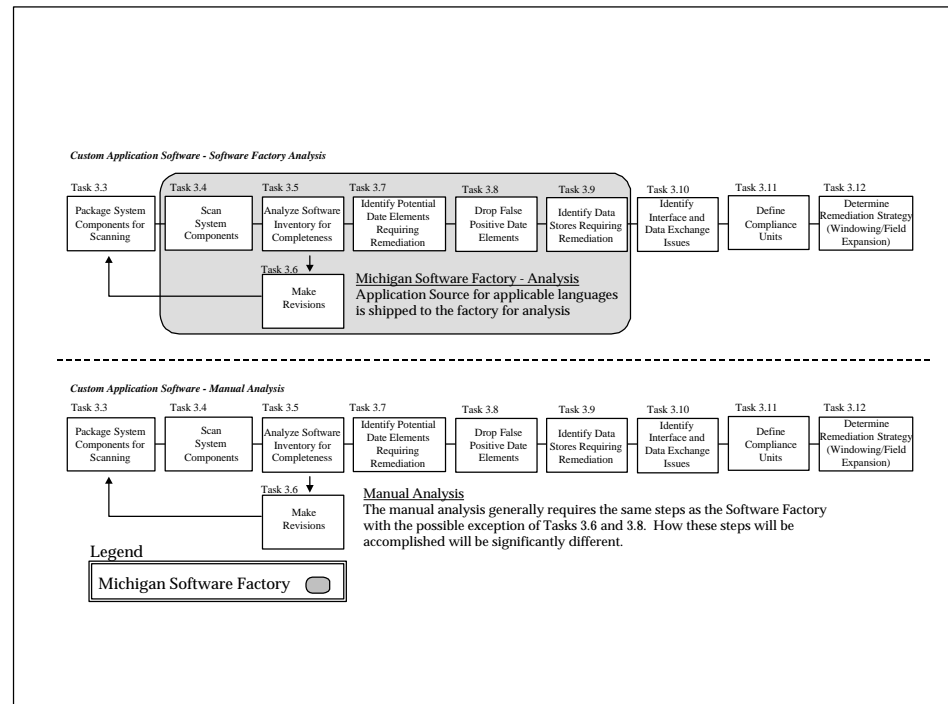
The objective of the Statewide Year 2000 Assessment (Michigan Year 2000 Remediation Methodology Activity 1; Task 1.4) is to develop a high-level view and approximate quantification of the Year 2000 remediation work required. Surveys are used to collect high-level application system information (e.g., What applications are an agency running? From what languages are those systems constructed? How many components are active by language within an application system within an agency?). This information is then used to estimate the size of the Year 2000 remediation effort. In comparison, the objective of the Requirements Design phase of the Standard Systems Development Life Cycle is to develop a high-level view of a standard development project.

Continuing the comparison, the objective of the **Detailed Assessment activity (Michigan Year 2000 Remediation Methodology Activity 3)** is to develop a lower, more detailed and application specific view of the work required. This is a detailed inventory of the source components requiring change. Normally, an automated software assessment product is used to

analyze the source code. Likewise, the objective of the Detailed Design phase of the Standard Systems Development Life Cycle is to develop a more detailed view of the work required. In a like manner, the remaining activities of the Michigan Year 2000 Remediation Methodology and the Standard Systems Development Life Cycle may be compared. The detailed application specific view is required by the remediation, testing, implementation and project management teams to document the scope of the work they are performing. The following diagram depicts a graphical representation of Activity 3:

Activity 3 –Detailed Assessment





Appendix A of this Volume contains a larger, more detailed graphical representation of the Michigan Year 2000 Remediation Methodology, **as well as a graphic representing the integration between the Michigan Year 2000 Remediation Methodology and the Software Factory processes.** The Detailed Assessment activity contains five sets of related tasks:

- Custom Application Software – Software Factory Analysis.
- Custom Application Software – Manual Analysis.
- Vendor Supplied Application Software Package.

- Infrastructure.
- Strategy Development.

The *Package Application Software* and the *Custom Application Software – Manual Analysis* set of related tasks define a process for assessing the Year 2000 impact on agency developed application software, as well as Vendor provided application software packages that will not be upgraded or replaced by the vendor. This may happen because the application has been highly customized for the agency, because the vendor no longer supports the application software package, or because the vendor has elected to not develop a Year 2000 compliant version of the software. Regardless of which analysis method is chosen, similar tasks are required. The difference between the analysis methods would be the level of automation and accuracy that could be achieved. Specific differences between the analysis methods appear at the Practice Aid level.

The *Package Application Software* task defines a process for analyzing vendor products for the Year 2000.

The *Infrastructure* set of related tasks define a process for assessing the Year 2000 impact on the SOM for products such as hardware, operating systems, and telecommunications.

The *Strategy Development* set of related tasks define a process for developing strategies required to support the remediation of an agency's application portfolio.

The following pages describe the tasks in Activity 3 – Detailed Assessment, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task:

Michigan Year 2000 Remediation Methodology

3.1

Activity: Detailed Assessment

Task: Confirm Application Systems and Subsystems by Agency

Description

The objective of Task 3.1 is to confirm or develop the agency's application system/subsystem structure. The structure is used to organize all subsequent downstream assessment, planning, remediation, testing and implementation activities.

The system/subsystem structure must relate to the business and technical support groups for the application system/subsystem. Both the business users and technical support groups must be considered so that a common understanding of the components to be remediated is achieved. The SOM previously conducted a Statewide Year 2000 Assessment (Keane) that required a system structure for each agency.

The previously defined systems/subsystem organizational structure can be circulated amongst the application subject matter experts for confirmation; or else a new set developed. Be sure to include both the IT organization application subject matter experts, as well as the end-user organization application subject matter experts, to obtain a common understanding, because often an IT organization and their user community have different views of the application organization. Confirming the application organizational structure will establish a strong foundation for future Year 2000 remediation efforts.

While this assessment is being conducted, the agency's legal staff should also begin to inventory and review contracts for year 2000 implications and updated warranty language.

Sample report formats are located in the Procedures and Practice Aids section of this Methodology.

Deliverables

- Confirmed Agency Application System/Subsystem Organization Structure Report

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Technology and Project Manager (P2)
- Business Owner (D1)

Michigan Year 2000 Remediation Methodology

3.2

Activity: Detailed Assessment

Task: Determine Preliminary Route (Renovate/Retire/Replace/Verify)

Description

The objective of Task 3.2 is to identify a preliminary route or disposition for each system in order to determine whether the system will be renovated, replaced, retired, verified, declared compliant or does not require any remediation.

Deliverables

- Updated Agency Application System/Subsystem Organization Structure Report
-

Responsible Party

- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

3.3

Activity: Detailed Assessment

Task: Package System Components for Scanning

Description

The objective of Task 3.3 is to get each application system targeted for automated scanning ready for assessment at the Software Factory. This process is called packaging. System components (batch jobs, programs, load libraries, copy members, transaction sysgens, copy members, database definitions, include members, etc.) are identified and placed in separate libraries by language. The completed package is then ready for scanning and assessment in Task 3.4. After the package is scanned, reports are generated identifying the areas of possible date errors, enabling the agency IT staff to organize its renovation efforts. At the option of the agency, the package is either renovated manually, or it can be done utilizing Year 2000 Software Factory tools.

Properly segmenting the application components by system/subsystem can be more difficult than it may first appear. It is important to determine up front the difficulties that an organization may face assembling and packaging a complete and accurate software inventory. The purpose of the Inventory Packaging Questionnaire (Attachment 1, in the Practice Aid Section 3.3) is to help evaluate these difficulties. If the results of the questionnaire indicate that an agency's software inventory is easily packaged, then the agency should proceed with the instructions contained within this Methodology. If, on the other hand, the results of the questionnaire indicate that packaging will be more difficult, the agency Year 2000 Project Manager should immediately contact the Michigan Year 2000 Project Office at DMB. When an agency contacts the Project Office, they review the agency application source code change management procedures and assist the agency in developing a customized procedure for gathering and segmenting an application component inventory.

Here are the suggested steps for software inventory packaging in preparation for automated scanning (for those system components that may be automatically scanned) and manual scanning (for those system components that may not be automatically scanned):

1. **Identify system/subsystem organizational structure** – The Agency System/Subsystem Organizational Structure Report developed in Task 3.1 is reviewed and updated if required.

Michigan Year 2000 Remediation Methodology

3.3

(Continued)

Activity: Detailed Assessment

Task: Package Systems Components for Scanning

Description

2. **Complete the Inventory Packaging Questionnaire** – The agency completes the Inventory Packaging Questionnaire to identify issues that may impact an agency's ability to build a complete and accurate software inventory package (Attachment 2 in the Procedures and Practice Aids Section 3.3).
3. **Evaluate the responses to the Inventory Packaging Questionnaire** – The agency and the Michigan Year 2000 Project Office (if appropriate) review the Inventory Package Questionnaire to determine if a more thorough inventory identification process is required.
4. **Identify Application Libraries** – Identify all application libraries that might have source code in them.
5. **Generate an electronic directory listing for each application library** – Using system utilities, generate an electronic directory listing that may be edited and electronically manipulated for each application library. The total number of objects in the library directory becomes a control total which is used to monitor and audit the changes made to the **Inventory Assignment Reports** (see Attachment 2, Procedures and Practice Aids Section 3.3) as the changes are made.
6. **Begin Building System Inventories** – Build a spreadsheet similar to the Attachment 2 in the Procedures and Practice Aids section 3.3, and place all the jobs identified into the **B. Active Jobs which have not been assigned to a System and Subsystem** segment of the spreadsheet.

Michigan Year 2000 Remediation Methodology

3.3 (Continued)

Activity: Detailed Assessment

Task: Package Systems Components for Scanning

Description (continued)

Assigning a job/transaction/program to a System and Subsystem is different in every organization. The following steps represent some of the steps that might be followed to assign an inventory:

7. **Assign the System Component Inventory to a System/Subsystem within an agency** – If standard naming conventions exist at the location, the quickest way to assign an inventory is to use standard naming. For instance, all jobs beginning with AR are Accounts Receivable. Once it is determined to which system and subsystem a job belongs, then determine whether or not a job is active or inactive. Scheduling information, operating system level daily job statistics, and application subject matter experts can provide information to determine whether a job is active or inactive. If it is determined that a job is active, with a known system and subsystem, then the job is moved under the appropriate System and Subsystem in segment **A. Active Jobs which have been assigned to a System and Subsystem** of the Batch Job Inventory Assignment Report.

If it is determined that a job is inactive, with a known system and subsystem, then the job is moved under the appropriate System and Subsystem in **segment C. Inactive Jobs which have been assigned to a System and Subsystem** of Attachment 2 in the Procedures and Practice Aids section 3.3.

If a job is determined to be inactive and the System and Subsystem assignment is not known for the job, then the job is moved to the **D. Inactive Jobs which have not been assigned to a System and Subsystem** segment of the Batch Job Inventory Assignment Report (Attachment 2 in the Procedures and Practice Aids section 3.3). As you will note, the title of the each segment (A-D) of the report contains in parenthesis the number of jobs. It is important to use these counts as a control total to validate that a job has not been accidentally dropped.

8. **Complete the Inventory Assignment Process** – Once the job inventory has been assigned to the maximum degree possible, the remaining list of unassigned jobs are recirculated amongst the application subject matter experts for assignment to a system and subsystem.

Michigan Year 2000 Remediation Methodology

3.3 (continued)

Activity: Detailed Assessment

Task: Package Systems Components for Scanning

Description (continued)

9. **Confirm the Active Inventory Assignments** – Once the job inventory has been fully assigned, the inventory assignments are printed with page breaks between systems and subsystems, and distributed to application subject matter experts for confirmation.
- 10. **Confirm the Inactive Inventory** – The list of inactive jobs is distributed for confirmation as well.
-
11. **Package the Inventory** – Packaging for transactions and programs by system and subsystem is completed in a similar manner to that of the batch jobs, as documented in the previous steps above.

Deliverables

Responsible Party

- | | |
|--|---|
| <ul style="list-style-type: none"> ▪ Inventory of Jobs Assigned to an Application System and Subsystem ▪ Inventory of Transactions Assigned to an Application System and Subsystem ▪ Inventory of Programs Assigned to an Application System and Subsystem ▪ Inventory of Inactive Jobs, Transactions and Programs | <ul style="list-style-type: none"> ▪ Assessment/Remediation Coordinator (D4) ▪ Programmer Analyst (D8) ▪ Business Owner (D1) |
|--|---|

Michigan Year 2000 Remediation Methodology

3.4

Activity: Detailed Assessment

Task: Scan System Components

Description

The objective of Task 3.4 is to assess the source code and load a repository with Year 2000 information. The packages assembled in Task 3.3 may be shipped to the Software Factory for assessment, or may be assessed within the agency, depending upon the ability of the Software Factory to support a specific platform and language. Those systems not supported will need to be assessed within the agency either in an automated fashion, if the tools exist, or in a manual fashion. The information stored in the repository will be used to refine the project plans, to develop more detailed component specific remediation plans, and to remediate each application system.

Source code scanners do not exist for all of the different languages and platforms represented in the SOM IT community. For language/platforms that are heavily used, agencies should identify a scanner to parse the source and load it into a repository. The scanner should assess batch job, transaction, program, copy members, maps, load modules, and data definition languages.

For some languages there will be no scanners (LINC, FORTRAN, etc.) In these cases, the agency will either need to contract with someone to write a scanner, develop a scanning tool internally or manually review the source and develop summary level metrics by language type within subsystem within system within agency.

Deliverables

- Loaded Repositories
- Inventory of Loaded Components

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- MIPC Representative (MIPC)
-

Michigan Year 2000 Remediation Methodology

3.5

Activity: Detailed Assessment

Task: Analyze Software Inventory for Completeness

Description

The objective of Task 3.5 is to assess the information stored in the repository created in Task 3.4 to determine the quality of the load procedure. Historically, most IT organizations have not managed their source tightly. Some of the problems usually experienced are:

- Tight source control and naming standards have not always been maintained, meaning that it will be more difficult to assign a system component to a system and subsystem.
- Out-dated source (JCL, PROCs, transactions, programs, load members and copies) may not have been purged from the appropriate library.
- Duplicate source names with slightly source code exists in multiple libraries. Which source module matches the object code?
- Different types of source are stored in a single source library. Most automated assessment tools require that different source types be placed in separate libraries.
- The source may be archived.
- The source may be missing.
- The source may not match the load module.

While these problems can be resolved, a complex environment will impact the ability of the project team to efficiently develop a component level inventory.

Michigan Year 2000 Remediation Methodology

3.5
(continued)

Activity: Detailed Assessment

Task: Analyze Software Inventory for Completeness

Description

Deliverables

- Assessment of the Software Inventory Quality

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- Platform Specialist (F4)
- Programmer Analyst (D8)
- MIPC Representative (MIPC)

Michigan Year 2000 Remediation Methodology

3.6

Activity: Detailed Assessment

Task: Make Revisions

Description

The objective of Task 3.6 is to correct the packaging inventory lists developed during Task 3.3 - *Package Systems Components for Scanning* and to rescan the inventory where necessary.

Deliverables

- Revised Inventory lists

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- Platform Specialist (F4)
- Programmer Analyst (D8)
-

Michigan Year 2000 Remediation Methodology

3.7

Activity: Detailed Assessment

Task: Identify Potential Date Elements Requiring Remediation

Description

The objective Task 3.7 is to identify those data elements in the SOM's inventory that are known to be date fields. Identification of the date fields forms the basis for the renovation and implementation estimates as the number of impacted data elements will be used to calculate the coding, bridging and testing effort.

Once the active production inventory is confirmed, the data elements are evaluated against a standard and the SOM customized set of matching patterns. The Year 2000 assessment tools use pattern-matching techniques to evaluate the data element's name, type and length. The matched names are stored in a repository as **potential**, unconfirmed date data items. A list of standard patterns that are used to identify **potential** date elements may be located in the Procedures and Practice Aids section of the Michigan Year 2000 Remediation Methodology.

Note: Be careful when setting up the assessment search engines. Some of the search engines provide an exclusion feature. For instance a pattern of "DT" would match on ACR-MASTER-FILE-DT as well as DTL-PRINT-LINE and DTL-PRINT-LINE-DT. An exclusionary pattern could be established to drop "DTL." In the above example, the data element DTL-PRINT-LINE would be dropped (correct) and DTL-PRINT-LINE-DT would also be dropped (incorrect).

A copy of a sample set of standard patterns to search for may be located in the Procedures and Practice Aids Section 3.7, in the back of this manual.

Deliverables

- Inventory of "Potential Date Elements" Impacted
- Inventory of Batch Jobs, Transactions and Programs Impacted

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- Platform Specialist (F4)
- Programmer Analyst (D8)
-

Michigan Year 2000 Remediation Methodology

3.8

Activity: Detailed Assessment

Task: Drop False Positive Date Elements

Description

The objective of Task 3.8 is to identify False Positive Date Elements (elements that are not date impacts to the application) and drop them from further consideration. Some of the Year 2000 tools in the marketplace have an open architecture that will allow the programmer/analyst the opportunity to intercede. Using an intelligent editor, the Year 2000 Analyst may edit the list of date elements potentially impacted, flagging the false positive date elements for removal. The key to developing a customized process for each Year 2000 Assessment Product is to reduce the amount of information that must be removed as much as possible by:

- Generating an external file that contains a complete list of potential date elements impacted (data element name, definition, and length).
-
- Developing a process to drop duplicate entries with a single reference back to one program where the data element may be found).
- Publishing the list of unique potential date elements.
- Editing the list of potential date elements, flagging false positives for removal.
- Removing the date elements that have been flagged from the assessment database.

Deliverables

Responsible Party

- Revised List of Date Elements Impacted
- Revised Application System and Subsystem Summary Metrics

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- Platform Specialist (F4)
- Programmer Analyst (D8)

Michigan Year 2000 Remediation Methodology

3.9

Activity: Detailed Assessment

Task: Identify Data Requiring Remediation

Description

The objective of Task 3.9 is to trace the data elements impacted through to the programs and data requiring remediation. The more sophisticated assessment tools reverse engineers the application source code, storing the results in a repository. Depending upon the sophistication of the information model, the breadth of the information stored in the repository, and the open nature of the repository data model, the SOM may be able to navigate the repository to identify not only what programs are impacted, but also answer the following questions:

- What jobs are impacted?
- What transactions are impacted?
- What programs are impacted?
- What copy code members are impacted?
- What data files are impacted?
- What databases, segments, tables, or schema are impacted?

If this information can not be gathered automatically, or the information gathered is incomplete, then this information will need to be gathered manually.

Deliverables

Responsible Party

- Inventory of Data Stores Requiring Remediation

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- Platform Specialist (F4)
- Programmer Analyst (D8)

Michigan Year 2000 Remediation Methodology

3.10

Activity: Detailed Assessment

Task: Identify Interface and Data Exchange Issues

Description

The objective of Task 3.10 is to identify the interfaces between systems. The more sophisticated assessment tools reverse engineers the application source code storing the results in a repository. Depending upon the sophistication of the information model, the breadth of the information stored in the repository, and the open nature of the repository data model, the SOM may be able to navigate the repository to identify the interfaces between systems.

If this information cannot be gathered automatically, or the information gathered is incomplete, this information will need to be gathered manually. Some of the required information may have already been gathered at a high level through the surveys in the Keane, Inc. Statewide Year 2000 Assessment.

The interface information is used to determine compliance unit organization in Task 3.11.

Note: It is extremely critical to assess all application systems and subsystems in order to properly identify the interfaces. If system A and system B share an interface, it will not be possible to automatically identify the interface unless both systems are assessed.

Deliverables

- Inventory of System Interfaces and the Systems with which they Interface

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Assessment Analyst (F2)
- Platform Specialist (F4)
- Programmer Analyst (D8)

Michigan Year 2000 Remediation Methodology

3.11

Activity: Detailed Assessment

Task: Define Compliance Units

Description

The objective of Task 3.11 is to define compliance units by aggregating closely linked applications into a single compliance unit. A compliance unit is a unit of work that will be remediated, tested and implemented together. Systems and subsystems are aggregated into compliance units to reduce the number of bridges that need to be developed.

To accomplish this, the *Agency Estimating Model - In Application System Priority Sequence* from Task 2.8 is updated with revised information based upon the detailed assessment performed in Tasks 3.1 – 3.10. The updated *Agency Estimating Model - In Application System Priority Sequence* report and the Inventory of System Interfaces are reviewed and the compliance units assembled and ordered in business priority sequence.

A copy of a sample report may be located in the Procedures and Practice Aids Section 3.11, in the back of this manual.

Deliverables

- Compliance Unit Report in Implementation Priority Sequence

Responsible Party

- Business Owner (D1)
- Agency Year 2000 Project Manager (D3)
- Assessment/Remediation Coordinator (D4)
- Interface Coordinator (D7)
- Assessment Analyst (F2)
- Programmer Analyst (D8)

Michigan Year 2000 Remediation Methodology

3.12

Activity: Detailed Assessment

Task: Determine Remediation Strategy (Windowing/Field Expansion)

Description

The objective of Task 3.12 is to identify for the major dates in each application system which remediation strategy will be used for renovation. To accomplish this, the analyst will need to:

- Identify the major dates in each application.
- Determine the data format for each major date in each application.
- Determine whether or not the data will span 100 years.
- Select a remediation option for each major date.

A copy of a sample report may be located in the Procedures and Practice Aids Section 3.12, in the back of this manual.

Deliverables

- Remediation Strategy for Major Dates within an Application System

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Programmer Analyst (D8)
- Assessment Analyst (F2)

Michigan Year 2000 Remediation Methodology

3.13

Activity: Detailed Assessment

Task: Analyze Vendor Products for Year 2000 Compliance

Description

The objective of this task is to determine whether or not a vendor product is Year 2000 compliant. To aid in this process, the Michigan Year 2000 Project Office is considering establishing a statewide vendor compliance database. To complete Task 3.13:

- Review the Statewide Year 2000 Assessment to identify the inventory of components to be checked for Year 2000 Compliance.
- Update the Inventory from the Statewide Year 2000 Assessment (if incomplete).
- Contact the Michigan Year 2000 Project Office to determine the status of the Vendor Compliance Database.
- If necessary, contact the vendor directly to determine if the product is compliant. Don't talk to the marketing personnel; talk to the engineering staff.
- If necessary, contact services like DataPro, who will determine whether a product is compliant or not for a fee.
- Communicate information about vendor compliance to the Michigan Year 2000 Project Office for inclusion in a Statewide Vendor Compliance database.

Deliverables

Responsible Party

- Vendor Software Products Compliance Status

- Programmer/Analyst (D8)
- Tools Specialist (F5)

Michigan Year 2000 Remediation Methodology

3.14

Activity: Detailed Assessment

Task: Identify Non-Compliant Equipment and Systems

Description

The objective of Task 3.14 is to identify and assess Year 2000 vulnerable equipment, systems software, and processes both inside and outside the information resource management area, including:

- | | |
|-----------------------------|---|
| ▪ Mainframes | ⌘ Networks |
| ▪ Mid Ranges computers | ⌘ WANS |
| ▪ Device Controllers | ⌘ LANs |
| ▪ Communications Equipment | ⌘ Servers |
| ▪ Operating System Software | ⌘ Desktop Hardware |
| ▪ Hard Drives | ⌘ Desktop Packaged Application Software |
| ▪ Scanners | ⌘ Network Switching Equipment |
| ▪ Tape and Cartridge Drives | ⌘ Telephones |
| ▪ Printers | ⌘ Building Infrastructure Systems |

▪ For each piece of equipment, the Infrastructure Analyst performs a similar set of steps to those defined in Task 3.13. This task is not intended to be a complete plan for identifying and resolving infrastructure issues related to the Year 200, but rather it is a place holder to indicate where in the methodology the infrastructure activities integrate.

Deliverables

- Non-Compliant Equipment and Systems Inventory

Responsible Party

- Infrastructure Coordinator (P7)
- Infrastructure Analyst (D13)

Michigan Year 2000 Remediation Methodology

3.15

Activity: Detailed Assessment

Task: Assess Impact on Application Software

Description

The objective of Task 3.15 is to identify the impact of the non-compliant equipment and systems software (Identified in Task 3.14) on the application software.

Deliverables

- Non-Compliant Equipment and Systems Impact on the SOM Application Systems

Responsible Party

- Infrastructure Coordinator (P7)
- Infrastructure Analyst (D13)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

3.16

Activity: Detailed Assessment

Task: Develop Testing and Validation Strategies

Description

The objective of Task 3.16 is to develop testing plans and validation strategies. The testing and validation of the remediated or replaced systems will require a multiple-tiered testing approach. For example:

- Unit Testing -- focuses on functional and compliance testing of a single application or software module.
- Integration Testing -- test the integration of related software modules and applications.
- System Testing -- test all of the integrated components of an information system.
- Acceptance Testing -- test the information system with live operational data.

Regardless of the selected validation and testing strategy, the scope of the testing and validation effort will require careful planning and the use of automated tools, including test case analyzers and test data libraries.

The testing plan should include:

- Testing Objectives
- Testing Process
- Types of Testing:
 1. Unit Testing
 2. Regression Testing (multiple cycles)
 3. Stress Testing
 4. Inter-System Testing
-

Michigan Year 2000 Remediation Methodology

3.16 (continued)

Activity: Detailed Assessment

Task: Develop Testing and Validation Strategies

Description

- Testing Tool Classes and Types
 - 1) Test Script Development
 - 2) File Comparison
 - 3) Test Data Distillation
 - 4) **COVERAGE MONITOR**
 - 5) On-line Debugging Aid
 - 6) Batch Debugging Aid
 - 7) Year 2000 Emulation
- Change Management
- Testing Organization
- Integration with Existing System Production systems
- Testing Issues
- Testing Feedback loops to feed Continuous Process Improvement

Deliverables

- Testing and Validation Strategy

Responsible Party

- Testing Coordinator (D5)

Michigan Year 2000 Remediation Methodology

3.17

Activity: Detailed Assessment

Task: Develop Implementation Strategy and Approach

Description

The Year 2000 implementation schedule must not only deal with the uncertainties common to all large system development efforts, but also should indicate all major milestones and the critical path for the completion of the Year 2000 program within an agency.

The implementation plan should include:

- Hardware conversions.
- Operating System Conversions.
- Vendor Application Software Package Conversions.
- Custom Application Software Conversions.
- Inter-agency conversion information (interfaces).

Deliverables

- Implementation Strategy and Approach

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)

Michigan Year 2000 Remediation Methodology

3.18

Activity: Detailed Assessment

Task: Finalize Route (Renovate/Retire/Replace/Verify) & Confirm Priorities

Description

The objective of Task 3.18 is to finalize the remediation route and priority information. The Updated Agency System/subsystem Organization Chart with the anticipated disposition column (Route) from Task 3.2 is reviewed and any changes to the routing (“remediate,” “replace,” “rewrite,” “retire,” “verify,” or “n/a”) decisions are made. After reconsideration of the additional data collected during the Detailed Assessment Activity, the State may elect to change the disposition of a system/subsystem.

The Updated Compliance Unit Report from Task 3.11 is reviewed and any changes to the compliance unit content and sequencing is made. After reconsideration of the additional data collected during the Detailed Assessment Activity, the State may elect to change the composition or sequencing of the compliance units.

Deliverables

- Updated Agency System/subsystem Organization
- Final Compliance Unit Report in Implementation Priority Sequence
-

Responsible Party

- Business Owner (D1)
- Agency Year 2000 Project Manager (D3)
-

Michigan Year 2000 Remediation Methodology

3.19

Activity: Detailed Assessment

Task: Revise Year 2000 Plan and Timeframes

Description

The objective of Task 3.19 is to revise the Year 2000 Project Plan to reflect the additional information gathered during Activity 2 – Detailed Assessment. Each agency has the final responsibility for achieving Year 2000 compliance and for avoiding service disruption. The Project Plan will include but not be limited to:

- Agency Year 2000 Project Vision.
- Schedules for all Agency-level Year 2000 activities.
- A complete prioritized list of application systems and their disposition (remediate/replace/rewrite/compliant/na).
- A list of languages and platforms supported with an approach defined for supporting the remediation.
- A resource usage strategy.
- An assessment of the impact of Year 2000 induced failures.
- Testing strategy.
- A vendor partnership strategy.
- Affected software/hardware/network/operating system/other inventory list.
- Agency-level Awareness and Communication program.

A sample report is located in the Procedures and Practice Aids Section 3.19, in the back of this manual.

Michigan Year 2000 Remediation Methodology

3.19
(continued)

Activity: Detailed Assessment

Task: Revise Year 2000 Plan and Timeframes

Description

--	--

Deliverables

- Final Year 2000 Project Plan
-

Responsible Party

- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Year 2000 Project Financial Officer (D2)
- Agency Year 2000 Project Manager (D3)
-

Michigan Year 2000 Remediation Methodology

3.20

Activity: Detailed Assessment

Task: Validate Initial Year 2000 Estimates (Keane, Inc.)

Description

The objective of Task 3.20 is to validate the final Year 2000 Estimates against the initial estimates and against the funds that were allocated by the SOM legislature. If the funding for an agency is inadequate, the Agency Year 2000 Project Manager should immediately contact the Michigan Year 2000 Project Office Director.

Deliverables

- Revised Estimates of the Year 2000 Costs
- Additional Funding Request (if required)
-

Responsible Party

- Business Owner (D1)
- Agency Chief Information Officer (D1A)
- Year 2000 Project Financial Officer (D2)
- Agency Year 2000 Project Manager (D3)
-
-

VI. Activity 4 - Code Modification

The objective of Activity 4 – Code Modification is to remediate the source code and data to support the new century. This does not necessarily mean that the source code must be renovated (source assessed, two character years identified and changed to support the Year 2000). The agencies use many vendor supplied application software packages. An upgraded release of the vendor supplied application software package that is Year 2000 compliant may also contain new functionality that the agency may need, or it may simply be more efficient and cost effective to upgrade a vendor supplied application software package than it would be to renovate it. In certain instances, it may be more efficient and cost effective to rewrite a business function that is not century compliant. In other instances, the functionality provided by an application system may no longer be required and the system should be retired. Activity 4 – Code Modification recognizes the diverse set of solutions that the agencies have for remediating each application system to support the Year 2000. Activity 4 has been subdivided into four remediation *Routes*:

- Year 2000 Renovation.
- Year 2000 Package Upgrade/Replacement.
- Year 2000 Rewrite.
- Year 2000 Retirement.

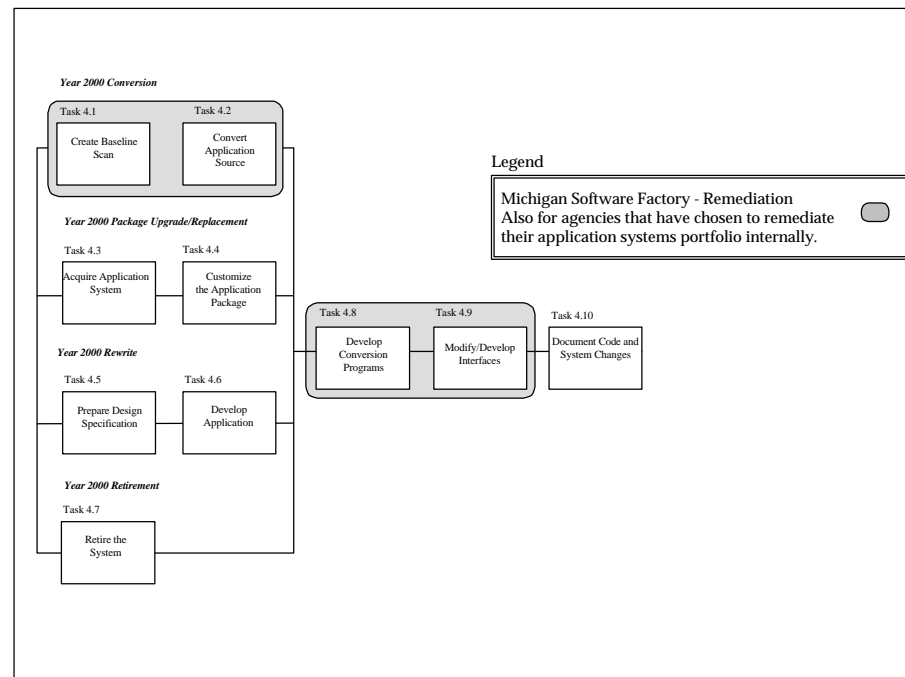
A route is a path through the Methodology. Year 2000 Package Upgrade/Replacement, Rewrite, and Retirement may, at first glance, appear to be independent projects that might be left out of the Year 2000 Methodology. They have been included in the Methodology because of the pervasive nature of the Year 2000 problem. Agency Year 2000 project managers and the Michigan Year 2000 Project Office need to understand the progress on all IT projects to ensure that all agencies are able to provide critical State services in the next millenium. Additionally, independent package replacement, rewrite, and retirement projects must interact with the Year 2000 project to support interfaces between systems.

During the Code modification activity, the agencies will need to renovate both frequently used languages (i.e., COBOL) and less frequently used languages (i.e., ALGOL, DBASE, etc.). Automated tools will exist for the more frequently used languages. However, manual processes and checklists will need to be developed for the less frequently used languages for which there are

no automated renovation capabilities. In certain instances, where the volume of a language is significant, it may be more cost effective to develop a custom renovation aid to assist in remediation.

The diagram below depicts Activity 4 – Code Modification.

Activity 4 –Code Modification



Appendix A of this Volume contains a larger more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. The following pages describe the tasks in Activity 4 – Code Modification, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task:

Michigan Year 2000 Remediation Methodology

4.1

Activity: Code Modification

Task: Create Baseline Scan

Description

The objective of Task 4.1 is to establish a baseline (point in-time backup) for all source code that will be changed during the course of the Year 2000 project. Proper source code management throughout the project is critical to successfully completing the Year 2000 project. Because of the duration of the Year 2000 project, it is impractical to freeze each agency's application portfolio. By creating a source code baseline, Agencies will be able to compare a later version of a source member to the baseline version and determine what changes were made. The list of changes can then be applied to the renovated source member to sync up a renovated source version with current production source. This process has been used very successfully on a number of projects to reduce significantly the window during which an application needs to be frozen.

Typically, a project manager would issue a letter, at the beginning of the project, requesting that all changes, with the exception of emergency changes, be postponed. A second letter would be issued at the beginning of system testing activities requesting that the application be frozen through implementation. This will minimize the number of times the project team needs to sync the renovated source with production. On rare occasions, the freeze could be postponed until the beginning of acceptance testing, which would require that the project team sync up the renovated source with the production source a second time. This scan is secondary to the initial assessment scan conducted in Activity 3. The previous scan provided the state with a total SOM application portfolio to be used in making estimates and reports to the state leadership. The baseline scan conducted here will provide the project team the most current copy of the application from which to measure all year 2000 changes, since there may have been a significant amount of time passed between the initial scan and the actual start of renovation.

The following items will be backed up: programs; copy code; job control language; includes; data definitions; transaction sysgens; and any other source components, which, when changed, impact the results of the system.

Deliverables

Responsible Party

- Source Code Baseline
(one copy)

- Assessment/Remediation Coordinator (D4)
- Programmer Analyst (D8)
- Factory Representative

Michigan Year 2000 Remediation Methodology

4.2

Activity: Code Modification

Task: Renovate Application Software

Description

The objective of Task 4.2 is to renovate the application software to support the Year 2000. The Agencies are faced with a complex challenge. Each Agency not only has languages such as IBM COBOL, UNISYS Series A COBOL, LINC, Fortran, and Bull COBOL, but also languages such as ALGOL, DBASE, EXCEL, and ACCESS. The objective of Task 4.2 is to renovate all languages used by the Agency. For many of the languages, there are no automated assessment or renovation tools in the marketplace. This task description will describe in general terms the automated renovation, the manual renovation, and when to consider building assessment and renovation aids. Because of the vast number of languages and platforms represented, it would be impractical to document each tool. The reader should consult automated tool references, where possible, for additional detail. Additionally, it is the intent of the Michigan Year 2000 Project Office that the Michigan Year 2000 Remediation Methodology continues to evolve. Therefore, if further clarification is required, contact the Michigan Year 2000 Project Office to determine if an additional Practice Aid has been developed to support the remediation of a language in which you are interested. It is the intent of the Michigan Year 2000 Project Office's to capture "Best Practices" from Agency experience, and either accept the documentation from the originating Agency, or else develop the documentation as a Practice Aid for others to use.

Automated Renovation:

There is no Year 2000 "silver bullet." To automatically renovate a source program, the automated tool must know which lines of code have date processing, what the original date formats are, what the desired target date formats are, and which date manipulation technique to apply in each situation.

The analytical tools/processes discussed in Activity 2 identify **potential** date elements. That is, data elements with names that have a pattern that *might* be a date element. If this information is used to renovate the source code without a review, then it is high likely that data elements that are not date related may be incorrectly changed.

The tools must know whether or not the Agency desires to have every date changed to a new format. The Agency may elect not to change dates on reports or screens where the date format is obvious.

Michigan Year 2000 Remediation Methodology

4.2

(continued)

Activity: Code Modification

Task: Renovate Application Software

Description

The automated tools have no way to determine in what format the original date is used. Those tools that purport to be automatic usually require that an analyst determine what format each data element has and communicate this information to the automated tool.

Additionally, the automated tools have no way to determine whether to use field expansion or windowing techniques, or in what date format the renovated date will be stored. Again, those tools that purport to be automatic usually require that an analyst determine what new format each date element will have and communicate this information to the automated tool.

If an Agency decides to use automated tools or the Software Factory, the Agency must recognize the significant amount of research, communications, and coordination that will be required.

Once the automated renovation is complete, the remediation analyst will generate a comparison listing that documents the changes that have been made between the two source versions. An original and renovated source code compile listing is generated. The remediation analyst then carefully analyzes the list of changes that the automated renovation tool provided to verify and validate that the correct changes were applied and to verify and validate that no unnecessary changes were made. When renovation errors are found, they will be corrected. For each language and platform, a Quality Assurance (QA) checklist is developed to remind the remediation analysts what to look for. At the bottom of the QA checklist is a signature block for the remediation analyst and quality assurance analyst to indicate approval.

Manual Renovation:

For those languages for which there are no automated remediation tools, the Agencies will need to develop Procedures and Practice Aids depicting the processes required to remediate the source code. The Procedures and Practice Aids will describe language specific issues and the steps required to remediate the source code. The primary difference between the automated and the manual renovation is the use of an intelligent editor. Several of the Year 2000 vendors have developed intelligent editors that are

Michigan Year 2000 Remediation Methodology

4.2 (continued)	Activity: Code Modification
	Task: Renovate Application Software
Description	
<p>linked to the assessment tools. Once the dates have been located, these tools give the remediation analyst the ability to drop into an intelligent editor that has the date related elements already identified and highlighted, and allows the user to trace the movement of data through procedural statements. These tools are used to facilitate both researching the changes required and renovating the source code. Once the manual remediation is complete, the downstream processes would be the same as the automated remediation processes.</p> <p>Industry experience has not demonstrated a significant difference in the level of effort required to automatically renovate a source member versus the manual approach. Specifically, automated renovation tools require knowledge of the search pattern to utilize the original date format, and the target renovation solution to employ. Subject matter experts are obliged to analyze the application, often requiring that they look at the code and data to determine this information. Once this information is identified, then it is provided to the renovation tool and the change is made very quickly. However, the same amount of work is required to review the dates and determine the renovation required, as it would take to simply <i>do</i> the renovation. Often, the programmer/analyst could simply make the change just as quickly while looking at the code.</p> <p>In systems where copy/include members are used heavily, the identification of the date fields, the original date format, and the target renovation techniques are determined once, and then applied throughout the entire application portfolio. In these cases, more benefit may be achieved using an automated renovation solution. However, a word of caution is in order. Many of the automated tools do <i>not</i> save a lot of time.</p> <p><i>During this activity, common copy members/macros are modified before source programs. After copy members/macros and source programs are modified, related screen code and reports are changed to support the processing of expanded date fields. Many organizations are electing to change only input fields and not necessarily change outputs (i.e., screens and reports). However, this can lead to confusion. Is 01/10/02 January 10, 2002, or October 2, 2001?</i></p> <p>Other considerations:</p> <ul style="list-style-type: none"> ▪ In renovating application systems, the Agency needs to consider changes in operating systems, compilers, utilities, domain-specific program products, and commercial database management systems. 	

Michigan Year 2000 Remediation Methodology

4.2

(continued)

Activity: Code Modification

Task: Renovate Application Software

Description

- An Agency-level quality assurance analyst to ensure quality should review the renovated source. Experienced software conversion factories have found that it is much less expensive to identify procedural and conversion errors earlier in the process. The Agency should initially conduct a rigorous quality assurance review on every source code member. Once the process has been streamlined and verified, and the analysts are comfortable with the process and results, then the Agency may wish to quality assure on a sampling basis.

Deliverables

- Renovated Application System
- Quality Assurance Review of the Renovated Application Source

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Assessment/Remediation Coordinator (D4)
- Factory Manager (F1)
- Renovation Analyst (F3)
- Programmer Analyst (D8)
- Quality Assurance Analyst (D11)
- MIPC Representative (MIPC)

Michigan Year 2000 Remediation Methodology

4.3

Activity: Code Modification

Task: Acquire Application System

Description

The objective of Task 4.3 is to acquire a vendor provided application software package. The Agency may determine that an upgraded release of an existing package is required, or that an alternative vendor supplied application software package is preferable.

The purpose of the Michigan Year 2000 Remediation Methodology is not to rearticulate a full package selection and implementation methodology, but to recognize that such a process may be appropriate in some cases. For small projects, tighter integration between the Methodologies may not be necessary. However, for larger projects that will be integrated with the Year 2000 Project, the Agency should develop a graphical representation of how the two methodologies will interact – the information flows and the dependencies between the project teams. This will help ensure that the interfaces between the remediated systems and customized vendor supported application software package are properly supported.

Deliverables

- Application Replacement/Remediation Coordination Plan

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.4

Activity: Code Modification

Task: Customize the Application Package

Description

The objective of Task 4.4 is to customize the upgraded or replaced vendor provided application software package. The original vendor supplied application software package may have been customized for use at the Agency. Upgrading to a new Year 2000 compliant release of a vendor supplied application software package may require that the Agency reapply the custom changes in order to provide similar functionality.

In certain instances, the original vendor may have gone out of businesses, or an alternative vendor supplied application software package may be selected. In this instance, the Agency will need to identify the additional features required and develop a project plan to customize the new vendor supplied application software package to perform the functionality desired.

The purpose of the Michigan Year 2000 Remediation Methodology is not to rearticulate a full package selection and implementation methodology, but to recognize that such a process may be appropriate in some cases. For small projects, tighter integration between the Methodologies may not be necessary. However, for larger projects that will be integrated with the Year 2000 Project, the Agency should develop a graphical representation of how the two methodologies will interact – the information flows and the dependencies between the project teams. This will help ensure that the interfaces between the remediated systems and customized vendor supported application software package are properly supported.

Deliverables

Responsible Party

- Application Replacement/Remediation Status Reporting

- Agency Year 2000 Project Manager (D3)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.5

Activity: Code Modification

Task: Prepare Design Specification

Description

The objective of Task 4.5 is to develop design specifications for a system that is to be rewritten. The purpose of the Michigan Year 2000 Remediation Methodology is not to rearticulate a full Systems Development Life Cycle or an Object Oriented methodology, but to recognize the Design Phase of another methodology.

For small projects, tighter integration between the Methodologies may not be necessary. However, for larger projects that will be integrated with the Year 2000 Project, the Agency should develop a graphical representation of how the two methodologies will interact – the information flows and the dependencies between the project teams. This will help ensure that the designs developed properly support the interfaces to and from the remediated systems.

Deliverables

- Application Development/Remediation Coordination Plan

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.6

Activity: Code Modification

Task: Develop Application

Description

The objective of Task 4.6 is to develop the application that is to be rewritten. The purpose of the Michigan Year 2000 Remediation Methodology is not to rearticulate a full Systems Development Life Cycle or an Object Oriented methodology, but to recognize the Construction Phase of another methodology.

For small projects, tighter integration between the Methodologies may not be necessary. However, for larger projects that will be integrated with the Year 2000 Project, the Agency should develop a graphical representation of how the two methodologies will interact – the information flows and the dependencies between the project teams. This will help ensure that the newly developed system properly supports the interfaces to and from the remediated systems.

Deliverables

- Application Development/Remediation Joint Status Reporting

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.7

Activity: Code Modification

Task: Retire the System

Description

The objective of Task 4.7 is to analyze a system that is scheduled for retirement more carefully to confirm that retiring the system will have no significant impact on the Agency. A report identifying all interfaces between the system scheduled for retirement and the other remaining systems is generated. Each interface is then carefully reviewed and a disposition for each determined.

Deliverables

- Retired Systems Interface Disposition Analysis

Responsible Party

- Business Owner (D1)
- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.8

Activity: Code Modification

Task: Develop Conversion Programs

Description

The objective of Task 4.8 is to design and develop data conversion utilities. During this task, the Agency identifies data file changes and creates smart bridges, filters, and data conversion routines. These smart bridges, filters, and data conversion routines support both the expansion of physical date fields as well as provide an option to shift all dates within a common time increment for a given conversion cycle. The latter feature may be used to support windowing as well as to advance dates into the next century for testing the remediation work that has been completed.

Definitions:

Smart Bridge – A smart bridge has the ability to interrogate the structure of a file or database to determine what format the data is in. Once the smart bridge has determined the structure of the file, the data is returned to the program for processing. To accomplish this, the I/O for each file is externalized and an interface between the invoking program and the I/O driver is established that supports the Year 2000. When an I/O request is made, the I/O driver determines how a date is to be processed and translates the date format to the appropriate format. For a read request, the I/O driver would interrogate the file and change the date format to fully expanded if the date had not been previously expanded, or would pass the date through to the calling program in the already expanded format. This technique allows the programs to be changed independently of the data conversions and vice versa, until such time that all the components, both programs and data, have been changed.

Filter – A filter is a program that reads the data in its current form and converts it into a meaningful format based on some sort of sliding scale. The windowing technique is a type of filter.

Data Conversion – A data conversion utility processes a file at a given point in time, converting the data from one format to another. For example, a date field could be converted from a six- (6) character MMDDYY format to an eight- (8) character YYYYMMDD format. Once the data has been converted, any previously supplied smart bridges can then be removed. It is a good idea to code the smart bridge to issue warning messages when interface file formats change to alert the support staff.

Michigan Year 2000 Remediation Methodology

4.8
(continued)

Activity: Code Modification

Task: Develop Conversion Programs

Description

Each Agency should evaluate the use of automated tools to support the creation of data conversion routines. This activity needs to be closely integrated with the modification of source code, conversion of test data, and the design and construction of data bridges.

Deliverables

- Smart Bridges for Selected Files
- Filters for Selected Files
- Data Conversion Programs for Selected Files

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Factory Manager (F1)
- Renovation Analyst (F3)
- Programmer Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.9

Activity: Code Modification

Task: Modify/Develop Interfaces

Description

The objective of Task 4.9 is to modify or develop interfaces for files and databases that are shared between application systems. Using the techniques described in Task 4.8, the analysts work with their counterparts in a different Agency or a different system within the same Agency to determine the best strategy for supporting an interface. Once a strategy has been agreed upon, then the application development team that owns the data develops a detailed conversion plan, including timeframes, milestones, and a projected implementation date. This information is then provided to the application support teams that access the shared data.

Deliverables

- Smart Bridges for Interface Files and Databases
- Filters for interface Files and Databases
- Data Conversion Programs for Interface Files and Databases

Responsible Party

- Assessment/Remediation Coordinator (D4)
- Interface Coordinator (D7)
- Factory Manager (F1)
- Renovation Analyst (F3)
- Programmer Analyst (D8)

Michigan Year 2000 Remediation Methodology

4.10

Activity: Code Modification

Task: Document Code and System Changes

Description

The objective of Task 4.10 is to identify and assemble system documentation changes required by the Year 2000 Project Manager and the Business Owner in support of agency due diligence efforts and version control documentation.

Deliverables

- Revised Documentation

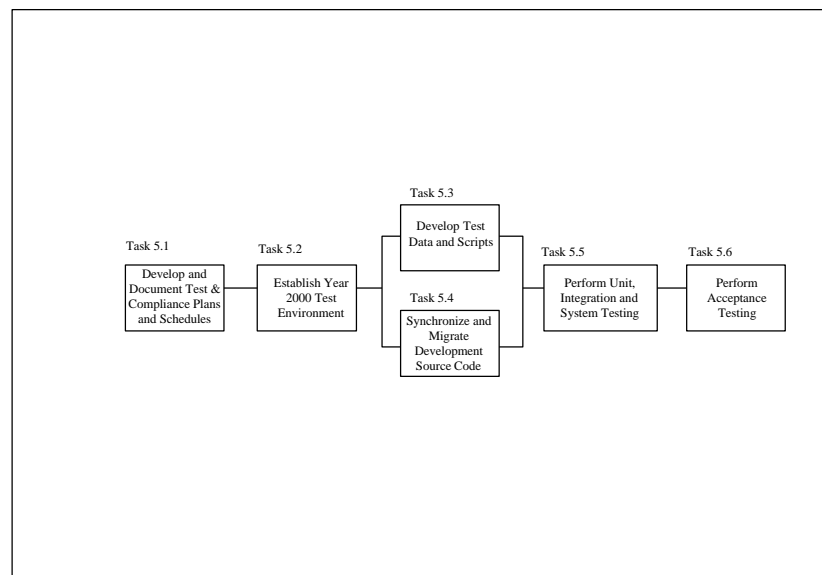
Responsible Party

- Business Owner (D1)
- Agency Year 2000 Project Manager (D3)
- Documentation Analyst (D12)

VIII. Activity 5 - Validation (Unit, System and Acceptance Testing)

The objective of this activity is to thoroughly test the remediated source code. It is estimated that approximately 50% of the effort expended for the Year 2000 will be in testing. It is therefore critical to develop an efficient and cost effective testing process in order to reduce the Year 2000 costs. The diagram below depicts graphically Activity 5 – Validation (Unit, System and Acceptance Testing).

Activity 5 –Validation (Unit, System and Acceptance Testing)



Appendix A of this Volume contains a larger more detailed graphical representation of the Michigan Year 2000 Remediation Methodology.

Activity 5 documents at a high-level the structured approach, tasks, and associated support procedures required for ensuring that the remediated software application is Year 2000 compliant. These procedures, subject to agency-specific modifications and enhancements, plus the development of Procedures and Practice Aids for each language and platform, and after detailed testing planning is completed, should effectively validate that the entire compliance unit of programs support both 20th and 21st century dates. The programs should be production ready when Activity 5 is complete.

The objective of this Activity is to define an approach that may be used for Year 2000 testing. However, it is impractical to document a complete methodology for the number of diverse languages and platforms supported by the SOM. Procedures and Aids for each language and platform that depict specific processess and related tools required to test that particular type of source code will be developed.

The following pages describe the tasks in Activity 5 – Validation (Unit, System and Acceptance Testing), the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task:

Michigan Year 2000 Remediation Methodology

5.1

Activity: Validation (Unit, System and Acceptance Testing)

Task: Develop and Document Test & Compliance Plans and Schedules

Description

The objective of Task 5.1 is to develop and document test and compliance unit plans and schedules for each renovated or replaced application or system component. Some application software package vendors do not disclose their source code or the internal logic of their products. Therefore, in these cases, testing should be complemented by a careful review of warranties or guarantees.

Deliverables

- Compliance Unit Schedule and Test Plan

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Testing Coordinator (D5)

Michigan Year 2000 Remediation Methodology

5.2

Activity: Validation (Unit, System and Acceptance Testing)

Task: Establish Year 2000 Test Environment

Description

The objective of Task 5.2 is to establish a Year 2000 Test environment. Testing the renovated or replaced systems and their components for Year 2000 compliance will likely require an isolated test facility, with multiple test systems, capable of simulating Year 2000 requirements. The test facility should provide sufficient disk storage for large test databases and multiple versions of the application software. A thorough testing environment would include the following separate test systems (some of which could be combined):

- Unit Testing/Regression (multiple cycles);
- System;
- Inter-System;
- Stress, and;
- Acceptance.

Each agency determines the degree to invest in testing. Agency management must balance the need to reduce the risk related to Year 2000 induced failure with the costs of supporting multiple test systems. Specifically, those agencies that support application systems with a high risk and cost of failure may elect to establish multiple independent test systems. The multiple test system environments will provide the agency with the ability to conduct parallel testing. Also, the agency will be able to test and retest production promotion processes as an entire application system is promoted from the Unit Testing system to the System Testing system to the Stress and Acceptance Testing systems. Those agencies that support applications with inherently less risk and cost of failure may elect to establish considerably fewer test systems.

Michigan Year 2000 Remediation Methodology

5.2 (continued)

Activity: Validation (Unit, System and Acceptance Testing)

Task: Establish Year 2000 Test Environment

Description

For each platform and language, testing tools are identified to improve the efficiency and accuracy of the testing process. The following is a list of Testing Tool Classes that support testing for Year 2000 compliance:

- | | |
|----------------------------|--------------------------|
| 1) Test Script Development | 5) On-line Debugging Aid |
| 2) File Comparison | 6) Batch Debugging Aid |
| 3) Test Data Distillation | 7) Year 2000 Emulation |
| 4) COVERAGE MONITOR | |

A PRACTICE AID IS DEVELOPED FOR EACH PLATFORM AND LANGUAGE DESCRIBING THE YEAR 2000 TEST ENVIRONMENT, WHICH TEST SYSTEMS HAVE BEEN ESTABLISHED FOR YEAR 2000 TESTING, AND THE TOOLS SELECTED TO CONDUCT TESTING. FOR CERTAIN PLATFORMS AND LANGUAGES, THERE MAY NOT BE A TOOL AVAILABLE IN THE TESTING TOOL CLASS. IN THIS INSTANCE, THE PRACTICE AID DESCRIBES THE MANUAL PROCESSES DEVELOPED TO SUPPORT THIS NEED.

ESTABLISHING THE YEAR 2000 TEST ENVIRONMENT ALSO INCLUDES ESTABLISHING AN INCIDENT AND ISSUE TRACKING PROCEDURE TO DOCUMENT REMEDIATION AND PROCESS PROBLEMS AND SUGGESTIONS.

Deliverables

- Established Testing Environment
- Language and platform specific Testing Practice Aids
- Incident Tracking Procedure

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Testing Coordinator (D5)
- Programmer/Analysts (D8)
- Tools Specialist (F5)
- Technology and Project Manager (P2)
- MIPC Representative (MIPC)

Michigan Year 2000 Remediation Methodology

5.3

Activity: Validation (Unit, System and Acceptance Testing)

Task: Develop Test Data and Scripts

Description

The objective of Task 5.3 is to develop the test data and detailed scripts required to adequately test an application. Historically, application systems maintenance has been conducted a minimal amount of testing required to ensure that the enhancement has been correctly applied. Year 2000 testing will require a much more thorough and rigorous approach. To properly ensure that an application is Year 2000 compliant, it is desirable that testing include all logic paths within the program, which is an impractical approach. However, there is a need to evaluate the quality of the test data and the accuracy of the test. The use of computer-aided software testing tools and test scripts has the potential to significantly reduce the testing and validation burden. Test management tools may help in the preparation and management of test data, and in the automation of the comparison of test results.

The agency creates test data files and online test scripts that will thoroughly test modified source code components during all phases of testing, including the Unit Test. High quality test data is important during the Unit Test because the detection of errors as early as possible during the testing process will help to minimize the overall project cost.

The agency reviews the use of test coverage monitors to scientifically measure the quality of test data used during Unit, System and Acceptance Testing. The measurement of test coverage will help reduce the risk of moving untested source code lines that have been modified into the production environment.

Deliverables

Responsible Party

- Test Data and Scripts

- Testing Coordinator (D5)
- Programmer/Analysts (D8)

Michigan Year 2000 Remediation Methodology

5.4

Activity: Validation (Unit, System and Acceptance Testing)

Task: Synchronize and Migrate Development Source Code

Description

The objective of Task 5.4 is to synchronize the renovated source code with the current production source code and migrate the renovated source code onto the appropriate test platforms. Ongoing production changes which have been applied since the source code baseline was established in Task 4.1 are integrated into the renovated source code and test data before Unit, Integration and System Testing is performed. It is recommended that production baseline changes be applied at least every three months to reduce the peaks in effort required to integrate these production changes. Creating a new source code baseline, and comparing the differences between the previous baseline and the new baseline using an automated comparison tool will identify production changes.

For test environments with multiple test systems (unit level test system, system level test system, and acceptance level test system), the analysts schedule and promote a compliance unit between test systems as appropriate.

Deliverables

- Remediated Source Code modified to be in sync with the Production Source Code

Responsible Party

- Testing Coordinator (D5)
- Programmer/Analysts (D8)

Michigan Year 2000 Remediation Methodology

5.5

Activity: Validation (Unit, System and Acceptance Testing)

Task: Perform Unit, Integration and System Testing

Description

The objective of Task 5.5 is to perform all required unit, integration, and system testing to ensure that the renovated or replaced systems and accompanying components are functionally correct and Year 2000 compliant. The testing should include regression, performance, stress, and forward and backward time testing.

During this Activity, the agency uses the converted baseline test data to execute modified source components and compare the results against production tests. This testing is initially conducted for 19XX dates, and then the dates are advanced to 20xx for 21st century testing. The results from comparing test results are used to identify errors and issues created during data and source conversion activities.

Deliverables

- Unit and System Tested Compliance Unit

Responsible Party

- Technology and Project Manager (P2)
- Testing Coordinator (D5)
- Interface Coordinator (D7)
- Programmer/Analysts (D8)
- System Tester (D9)

Michigan Year 2000 Remediation Methodology

5.6

Activity: Validation (Unit, System and Acceptance Testing)

Task: Perform Acceptance Testing

Description

The objective of Task 5.6 is to conduct acceptance testing. Acceptance testing is the final stage of the multiple-tiered testing and validation process. During this task, the entire information system -- including data interfaces -- is tested with operational data. In general, it is expected that the acceptance testing will be done on the Year 2000 test facility with duplicate databases to avoid risk to the production systems and the potential contamination of data.

During Acceptance Testing, users from the agency execute remediated source code components using either production data files or subsets of production data files, and then compare the results against a parallel test executed using the production object modules. At a minimum, the testing results are reviewed with the Business Owner (D1) or the Business Owner's (D1) representative.

The results may also be reviewed by the Office of the Auditor General.

Deliverables

- Fully Tested Application System/Compliance Unit
- Sign-off from Business Owner acknowledging Year 2000 operability of application system/compliance unit.

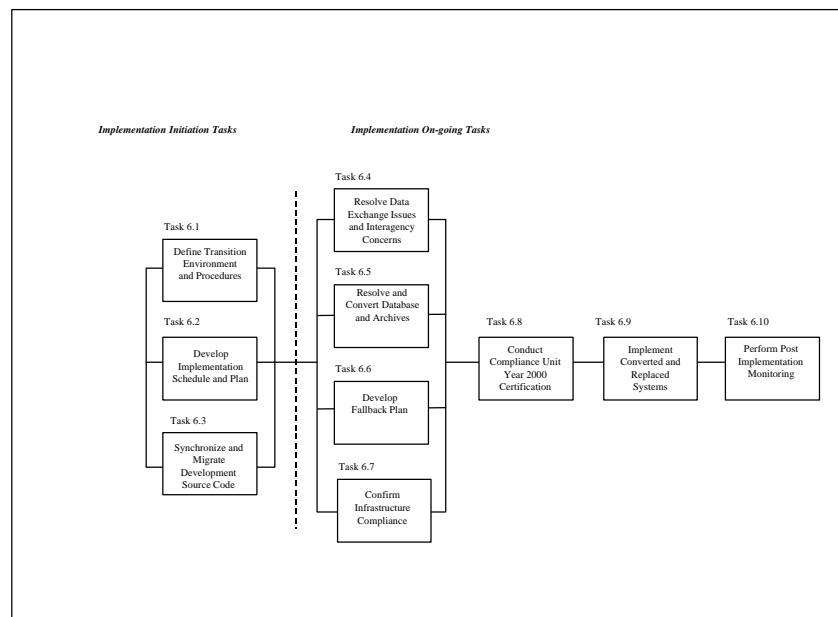
Responsible Party

- Business Owner (D1)
- Agency Year 2000 Project Manager (D3)
- Testing Coordinator (D5)
- Acceptance Tester (D10)

VIII. Activity 6 - Implementation

The objective of this activity is to ensure that the remediated applications are ready to promote back into production.

Activity 6 –Implementation



Appendix A of this Volume contains a larger more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. The following pages describe the tasks in Activity 6 – Implementation, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task.

Michigan Year 2000 Remediation Methodology

6.1

Activity: Implementation

Task: Define Transition Environment and Procedures

Description

The objective of Task 6.1 is to define the transition environment and procedures required to implement the remediated systems. The transition from the current environment to Year 2000 compliant systems is difficult and complex. First, some of the key components of the Agency systems -- Year 2000 compliant databases, operating systems, utilities, and other Vendor supplied application software packages -- may not be available until late 1998 or early 1999. Second, external data suppliers may not plan to complete their renovation and testing until 1999. Third, the testing, validation, and correction processes may take much of 1999. Fourth, replacement systems may not be ready for testing until late 1999. As a result, agencies may be forced to operate -- at least for a time -- parallel systems and databases.

Each Agency determines the procedures and proper sequencing to implement the remediated systems. Some application systems may not be dependent upon upgraded operating system or hardware, and therefore may be implemented at any time. Others may be dependent upon upgraded operating system or hardware components, and may be partially implemented, with the dependent features only implemented once the upgrade is complete. Other application systems may require that the dependent upgraded operating system or hardware be implemented prior to the implementation of the application system into production.

For instance, a number of tools exist to advance the system clock temporarily for test purposes into the next century. These tools are used for testing Year 2000 compliance. Unfortunately, when the clock is advanced, the operating system components and system utilities operate as they would in the 21st century. Many of these products have licensing periods that end prior to the Year 2000, and abort when used after the licensing expiration date. As a result, the Agency may need to revisit each vendor supplied software package license and arrange with the vendors to extend the license for test purposes.

Deliverables

Responsible Party

- Transition Environment and Procedures

- Agency Year 2000 Project Manager (D3)
- Testing Coordinator (D5)
- Implementation Coordinator (D6)

Michigan Year 2000 Remediation Methodology

6.2

Activity: Implementation

Task: Develop Implementation Schedule and Plan

Description

The objective of Task 6.2 is to develop an implementation schedule and plan. The Year 2000 implementation schedule must not only deal with uncertainties common to all large system development efforts, but also should indicate all major milestones and the critical path for the completion of the Year 2000 program.

The Implementation Schedule should include a description of and a calendar for the completion of the following:

Pre-implementation

- Change Management – Documentation of production synchronization.
- Remediation Package – including copies of the various versions of each program and the comparison listings.
- Document “bug” fixes – A list of previous production “bugs” that were fixed during the remediation.
- Contingency Plan – The fallback plan created in Task 6.7.
- Capacity Planning – Communications requesting additional DASD, system setup, and configuration changes.
- Scheduling Changes – Communications requesting scheduling changes.
- System Test Plan – Systems test plan, systems test and quality assurance sign-off on the systems test including:
 - Percentage Coverage
 - Performance statistics
- Sponsor Acceptance – Project owner and sponsor acceptance test sign-off.

Michigan Year 2000 Remediation Methodology

6.2 (continued)

Activity: Implementation

Task: Develop Implementation Schedule and Plan

Description

Cutover

- Inventory of new Components – Inventory of new components to be added.
- Changed Components – Inventory of components to be changed.
- File Conversions/Audits – Inventory of file, database and parameter changes to be made.
- Report Deliveries – Inventory of new reports and their disposition.
- Operators Documentation – Revised operations documentation.
- Modify procedures on the system – Revised automated systems documentation.
- Operations Support – Operations support for on-site and overnight support during implementation.

Post Implementation

- Post-Implementation Support – Maintenance support for post implementation problems.
- Performance Review – Performance review to ensure that the system performance has not degraded.
- Sponsor Sign off – Business owner review of completed implementation plan and approval for production promotion

Deliverables

Responsible Party

- Implementation Schedule and plan

- Implementation Coordinator (D6)
- Programmer/Analyst (D8)
- Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology

6.3

Activity: Implementation

Task: Synchronize and Migrate Development Source Code

Description

The objective of Task 6.3 is to synchronize and migrate the development source code. Ongoing production changes which have been applied since the source code baseline was established in Task 4.1 are integrated into the remediated source code and test data before Unit, Integration and System Testing is performed. It is recommended that production baseline changes be applied at least every three months to reduce the peaks in effort required to integrate production changes. Creating a new source code baseline, and comparing the differences between the previous baseline and the new baseline using an automated comparison tool identifies production changes.

For test environments with multiple test systems (unit level test system, system level test system, and acceptance level test system), the analysts schedule and promote a compliance unit between test systems.

Deliverables

- Remediated Source Code modified to be in sync with the Production Source Code

Responsible Party

- Testing Coordinator (D5)
- Programmer/Analysts (D8)

Michigan Year 2000 Remediation Methodology

6.4

Activity: Implementation

Task: Resolve Data Exchange and Inter-Agency Concerns

Description

The objective of Task 6.4 is to resolve data exchange issues and interagency concerns, including ensuring that:

- All outside data exchange entities are notified.
- Data bridges and filters are ready to handle non-conforming data.
- Contingency plans and procedures are in place if data is not received from an external source.
- Contingency plans and procedures are in place if invalid data are received from an external source.
- The validation process is in place for incoming external data.

All data issues and interagency concerns must be resolved prior to acceptance testing and implementation.

Deliverables

- Identification and review of all Data Exchange and Inter-Agency Concerns

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)
- Technology and Project Manager (P2)
- Interface Coordinator (D7)

Michigan Year 2000 Remediation Methodology

6.5

Activity: Implementation

Task: Resolve and Convert Database and Archives

Description

The objective of this task is to convert the databases, files and archives to support the Year 2000. During this task, the agency will execute the conversion routines created during Task 4.8, Develop Conversion Programs.

Deliverables

- Inventory of Converted Databases and Files
- Converted Databases and Files

Responsible Party

- Technology and Project Manager (P2)
- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

6.6

Activity: Implementation

Task: Develop Fallback Plan

Description

The objective of Task 6.6 is to develop implementation contingency plans. Unlike routine system development or maintenance efforts where schedule slippages are non-fatal -- and common -- the Year 2000 program must be completed on time. Agencies should develop realistic contingency plans -- including the development and activation of manual or contract procedures -- to ensure the continuity of their core business processes, and the development and activation of contingency procedures to back out a compliance unit, if necessary.

Deliverables

- Contingency Plan of manual procedures to ensure business continuity
- Procedures to Restore a Prior Release of a Production Application System

Responsible Party

- Technology and Project Manager (P2)
- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)
- Interface Coordinator (D7)
- Business Owner (D1)

Michigan Year 2000 Remediation Methodology

6.7

Activity: Implementation

Task: Confirm Infrastructure Compliance

Description

The objective of Task 6.7 is to confirm that all infrastructure components are compliant prior to implementing a compliance unit. Examples of infrastructure components include:

- | | |
|-----------------------------------|---|
| ▪ Mainframes | • Networks |
| ▪ Mid Ranges computers | • WANS |
| ▪ Device Controllers | • LANS |
| ▪ Communications Equipment | • Servers |
| ▪ Operating System Software | • Desktop Hardware |
| ▪ Hard Drives | • Desktop Packaged Application Software |
| ▪ Scanners (e.g., Bar code, etc.) | • Network Switching Equipment |
| ▪ Tape and Cartridge Drives | • Telephones |
| ▪ Printers | • Building Infrastructure Systems |

This task is not intended to be a complete plan for identifying and resolving infrastructure related Year 2000 issues. This task is a placeholder to indicate where in the methodology the infrastructure activities integrate.

Deliverables

Responsible Party

- | | |
|--|--|
| <ul style="list-style-type: none"> ▪ Compliant Infrastructure Components Review | <ul style="list-style-type: none"> ▪ Agency Year 2000 Project Manager (D3) ▪ Infrastructure Coordinator (P7) ▪ Infrastructure Analyst (D13) |
|--|--|

Michigan Year 2000 Remediation Methodology

6.8

Activity: Implementation

Task: Conduct Compliance Unit Year 2000 Certification

Description

The objective of Task 6.8 is to certify that an application is Year 2000 compliant. Adherence to the Michigan Year 2000 Remediation Methodology, in conjunction with the Software Quality Assurance Program (SQAP) process and product reviews, form the cornerstone of the Michigan Year 2000 Certification. Agencies are required to construct a certification package by assembling a packet that will include the following materials for agency level quality assurance analyst to review:

- Documentation from the Year 2000 remediation projects demonstrating that the Michigan Year 2000 Remediation Methodology was followed.
- Project planning documentation.
- Test and validation strategies.
- Implementation Strategy and Approach.
- Project Status Reporting.
- Inventory of Renovated Source Components.
- Detailed Test Plan.
- Unit, System, Acceptance Testing results.
- Implementation Schedule and Plan.
- Fallback Plan.
- Production Source Code Synchronization Results.

The Quality Assurance Analyst will review the certification package, validating that the compliance unit has been remediated in accordance with the Michigan Year 2000 Remediation Methodology and that the customized components of the Methodology (Practice Aids) have been approved by the Software Quality Assurance Program (SQAP) staff within the Michigan Year 2000 Project Office.

Michigan Year 2000 Remediation Methodology

6.8
(continued)

Activity: Implementation

Task: Conduct Compliance Unit Year 2000 Certification

Description

Deliverables

- Certified Year 2000 Compliance Units
- Sign-Offs from responsible parties acknowledging certification of Year 2000 operability.

Responsible Party

- Agency Chief Information Officer (D1A)
- Agency Year 2000 Project Manager (D3)
- Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology

6.9

Activity: Implementation

Task: Implement Renovated and Replaced Systems

Description

The objective of Task 6.9 is to implement the remediated systems back into production. During Implementation, the agency transfers modified Year 2000 source code components that have been approved for migration into production status and performs related data conversions. In addition, new data bridges are implemented, and training for changes in user/operations instructions is provided.

Based on the Transition Environment plan developed in Task 6.1, data bridges that have a temporary life are removed.

Deliverables

- Implemented Application System/Compliance Unit (Successfully Year 2000 Operated Application System/Compliance Unit)
- Summary of Issues Encountered During Implementation

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology

6.10

Activity: Implementation

Task: Perform Post Implementation Monitoring

Description

The objective of Task 6.10 is to perform post implementation support and monitoring. Following the implementation of modified source code components and data conversion, post implementation support is provided to assist production maintenance personnel in the resolution of production problems associated with Year 2000 changes for some limited period of time.

Deliverables

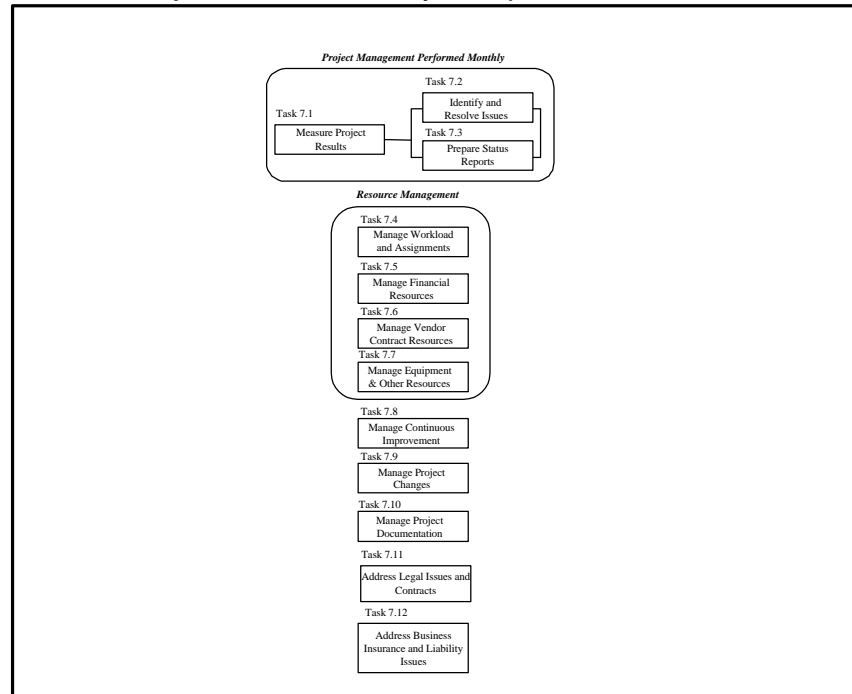
- Post Implementation Support as Required
- Summary of Issues Encountered During Post Implementation

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Implementation Coordinator (D6)
- Interface Coordinator (D7)
- Programmer/Analyst (D8)

IX. Activity 7 - Program Management

The objective of the Program Management activity is to provide management control and reporting of Year 2000 tasks to assure that the agency Year 2000 Project is successfully completed on time and within the allocated budget.



The following pages describe the tasks in Activity 7 – Program Management, the list of associated deliverables to be produced during the execution of the task, and the roles responsible for performing each task.

Michigan Year 2000 Remediation Methodology

7.1

Activity: Program Management

Task: Measure Project Results

Description

The objective of Task 7.1 is to measure project results and to determine project status by analyzing the progress of the agency Year 2000 Project as compared to the original project plan. If the Year 2000 project is measured on a monthly basis, the agency is able to determine which practices work and which don't. Once properly implemented, the measurement program can identify and improve chronic problems, such as excessive schedule pressure, inadequate remediation tools, and inadequate computer resources.

There are three keys to using Measurement effectively:

- Goals to determine how you want to improve the project.
- Questions to ask in order to attain the goals.
- Metrics established to measure and answer the questions.

Deliverables

- Year 2000 Process Evaluation Checklist
- Year 2000 Measurement Guideline

Responsibilities

- Factory Manager (F1)
- Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology	
7.2	Activity: Program Management
	Task: Identify and Resolve Issues
Description	
<p>The objective of task 7.2 is to identify and resolve issues encountered during the course of the agency Year 2000 Project. Solutions may include the revision of project work plans and schedules, allocating additional resource to project tasks, seeking project management assistance, and implementing quality assurance procedures in support of the Year 2000 effort.</p> <p>Using information submitted by Agencies and collected by the Year 2000 Progress Reporting System and other project management tools, key items requiring attention are identified. Any significant variance from plan is identified for the following:</p> <ul style="list-style-type: none"> ▪ Year 2000 Project Assumptions ▪ Progress of compliance units and Year 2000 resource hours ▪ Effectiveness of both management and technical personnel ▪ Usefulness and effectiveness of Year 2000 tools ▪ Date slippage and missed checkpoints ▪ Accuracy of time and resource estimates ▪ Unexpected noncompliance of tools and other hardware ▪ Interaction with external contractors, vendors and business partners 	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Year 2000 Project Status Report Section IV 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology

7.3

Activity: Program Management

Task: Prepare Status Reports

Description

The objective of Task 7.3 is to provide guidelines for the preparation of monthly project status reports. The contents of the project status reports is as follows:

- Outline of work accomplished during the past two weeks (Section I).
- Work to be accomplished during the next two weeks (Section II).
- Summary of encountered or anticipated problems (Section III).
- Significant deviations from previously agreed-upon work plans (Section IV).
- Effort expended (in hours) on project activities (Section V).

The project status could be conveyed locally through the use of a “control board” with updates applied on a daily or weekly basis, as appropriate. A “control board” is a large chart or actual board located on a wall that may be used to keep track of multiple related projects at the same time. A typical control board might include the lists of application remediation projects on the left, with a timeline across the top. A control board is similar to a Gantt Chart, with additional status information and inter-project relationships depicted. In this particular example, the status of active Application Remediation Projects is updated and tracked by milestone on the control board. An electronic version of the control board could be maintained simultaneously for broadcast to interested stakeholders.

Deliverables

- Year 2000 Project Status Report
- Year 2000 Control Board
- Year 2000 Electronic Control Board

Responsibilities

- Agency Year 2000 Project Managers (D3)
- Factory Manager (F1)
- Programmer/Analyst (D8)

Michigan Year 2000 Remediation Methodology	
7.4	Activity: Program Management
	Task: Manage Workload and Assignments
Description	
<p>The objective of Task 7.4 is to manage staffing resources. Project staffing requirements are compared periodically to project staffing loads to determine if the appropriate skill sets and staffing levels are assigned to each task.</p> <p>In the event that a shortage is identified, the pool of available existing staff is reviewed and the individual(s) with the highest possible relevant skills assigned to the project. Other solutions might include:</p> <ul style="list-style-type: none"> ▪ Cross agency utilization of subject matter experts and technical staff is encouraged, if appropriate for the situation. ▪ The Michigan Year 2000 Project Office will look into whether or not other Agencies may have available existing resources that could be loaned to another agency. ▪ If project deadlines fall behind, experienced suppliers or contractors may be required. In the event that additional external resources are required, an Invitation To Bid (ITB) is developed. 	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Revised Year 2000 Resource Plan ▪ Project Status Reports Section III 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3) ▪ Factory Manager (F1)

Michigan Year 2000 Remediation Methodology	
7.5	Activity: Program Management
	Task: Manage Financial Resources
Description	
<p>The objective of Task 7.5 is to manage the financial resources defined in the agency Implementation Strategy Plan. The Financial Risk Management Officer will manage the following:</p> <ul style="list-style-type: none"> ▪ Year 2000 Project Hour/Cost Estimates; ▪ Vendor Contract Awards; ▪ Year 2000 Project Status; ▪ Project Change of Scope Control; and ▪ Project closeout. <p>An integrated project management system with cost /schedule features is used quantify project progress in monetary terms.</p>	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Year 2000 Project Status Report (Sections IV & V) ▪ Updated Year 2000 Project Plan ▪ Cost/Schedule Implementation Report 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology	
7.6	Activity: Program Management
	Task: Manage Vendor Contract Resources
Description	
<p>The objective of Task 7.6 is to ascertain that vendor contract resources comply with the terms of their contractual agreements for the Year 2000 project. Work plans and ongoing progress are reviewed to determine that these conditions are met and that the project is on scheduled as set forth in the workplan. A formal evaluation of the technical competency of vendor staff assigned to the Year 2000 Project is in order. If appropriate skill sets do not match the task required, replacement of vendor staff is recommended.</p> <p>Project review meetings with Vendor project managers are conducted at regular intervals (usually weekly or bi-weekly) to ensure early detection of problems. Progress reports from vendors are analyzed to determine if completed Year 2000 project activities coincide with reported results.</p>	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Year 2000 Project Status Report (All Sections) ▪ Updated Year 2000 Control Board ▪ Updated Year 2000 Electronic Board 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3) ▪ Factory Managers (F1)

Michigan Year 2000 Remediation Methodology	
7.7	Activity: Program Management
	Task: Manage Equipment & Other Resources
Description	
<p>The objective of this task is to manage the equipment and other resources required for conducting the agency Year 2000 Project. The Year 2000 Project will require a substantial number of human resources. Depending upon the staffing mix selected, the agency may be required to establish new networks, to purchase additional workstation hardware, and to expand the mainframe capacity.</p>	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Equipment Management Plan ▪ Other Deliverables as Required 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology	
7.8	Activity: Program Management
	Task: Manage Continuous Improvement
Description	
<p>The objective of Task 7.8 is to identify and implement changes that will increase the quality of the work performed while reducing the costs and risks. Opportunities for improvement are identified as a result of product level and process level evaluations. For each major improvement identified, the agency Year 2000 Project Manager documents the following:</p> <ul style="list-style-type: none"> ▪ Overview of the change requested; ▪ Detailed description of the change requested; ▪ Workplan and Return on Investment (ROI) analysis of the change requested; ▪ Any other supporting documentation that might be helpful; and ▪ Documentation summarizing the changes that have been made and the results achieved. 	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Continuos Improvement Plans 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology

7.9

Activity: Program Management

Task: Manage Project Changes

Description

The objective of Task 7.9 is to establish a procedure to control unplanned revisions to the Year 2000 Project and to define the activities and tasks that will minimize the risks when making the change. All changes to the original project plan will be documented and evaluated to determine the impact of the change and whether it can be accommodated. Considerations are that the change can be accommodated:

- Within the project resources and timelines;
- But will require an extension of the deliverable schedule;
- Within the current deliverable schedule but additional resources will be needed;
- With additional resources and an extension of the deliverable schedule will be required;
- With a multiple release strategy and prioritizing of the deliverables across the release dates; and
- Without a significant change to the project.

A project impact statement is prepared that identifies the alternative courses of action to be considered, the positive and negative aspects of each, and the recommendations as to which alternative might be the best.

Control of “scope creep” is a vital part of the ongoing program management process. Using the containment mechanisms defined as part of the Software Quality Assurance Program (SQAP), proposed changes are reviewed and evaluated to determine the impact on cost, schedule, personnel and requirements. Any revision is thoroughly documented and reported.

<i>Michigan Year 2000 Remediation Methodology</i>	
7.9	Activity: Program Management
	Task: Manage Project Changes
<i>Description</i>	
<i>Deliverables</i>	<i>Responsibilities</i>
<ul style="list-style-type: none"> ▪ Year 2000 Project Status Report (Section III & IV) ▪ Project Impact Statement ▪ Request for Proposal (RFP) Preparation ▪ Update Year 2000 Project Monitoring System 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology	
7.10	Activity: Program Management
	Task: Maintain Project Documentation
Description	
<p>The objective of Task 7.10 is to maintain project level documentation. A documentation checklist is used to identify what types of documentation are maintained by Activity within the Methodology, where it should be maintained, and for how long it should be maintained. There is a section within the Software Quality Assurance Program (SQAP) that contains a complete list of documentation that is required for a Year 2000 Project.</p> <p>Each agency Year 2000 Project Manager will need to develop procedures and a location for storing documentation.</p>	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Year 2000 Documentation Checklist ▪ Year 2000 Documentation Guideline ▪ Year 2000 Events Journal 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3)

Michigan Year 2000 Remediation Methodology

7.11

Activity: Program Management

Task: Address Year 2000 Legal and Contract Issues

Description

The objective of Task 7.11 is to maintain awareness of the growing visibility of Year 2000 legal issues and to promote due diligence within all areas of the project. Contracts, warranty language and maintenance agreements need to be reviewed and modified to meet specific Year 2000 needs. An inventory and review of all contracts should be performed in parallel with the information technology work that is being performed by the IT staff. The agency contract attorney may become a part of the project team during this review.

Each agency Year 2000 Project Manager will need to develop procedures for obtaining and a location for storing documentation. The audit trail documentation is necessary to meet due diligence requirements.

Deliverables

- Year 2000 Contract Inventory
- Year 2000 Specific Contract Language
- Year 2000 Specific Warranty Language

Responsibilities

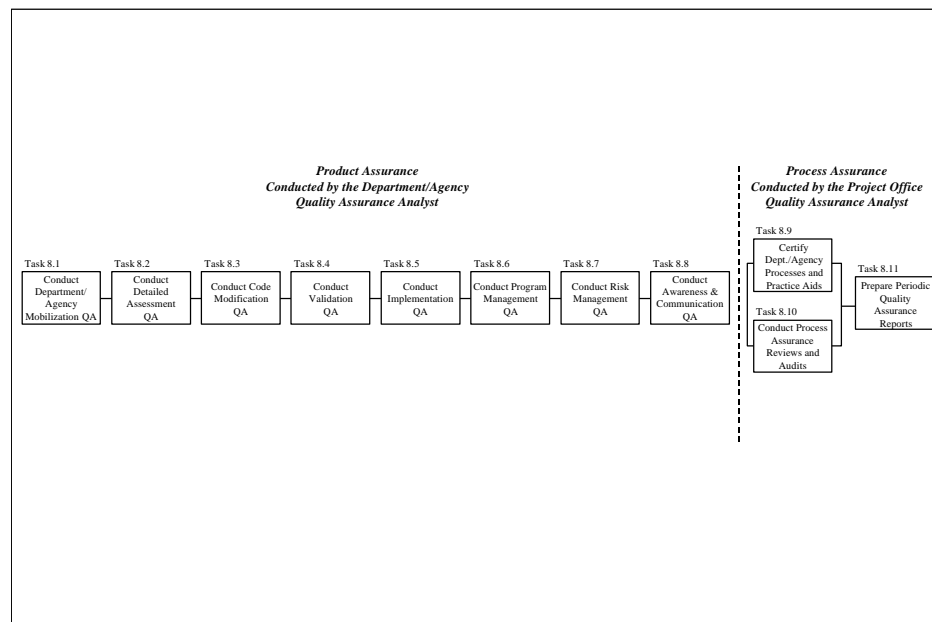
- Agency Year 2000 Project Managers (D3)
- Legal Issue and Contract Coordinator (D15)
- Project Office Legal Issue and Contract Coordinator (P6)

Michigan Year 2000 Remediation Methodology	
7.12	Activity: Program Management
	Task: Address Business Insurance and Liability Issues
Description	
<p>The objective of Task 7.12 is to provide the agency with necessary information and direction in business continuance and Year 2000 insurance issues. Agency executives should be kept aware of the issues surrounding Year 2000 liability and litigation. The agency legal staff personnel may become a project team member as the need arises.</p> <p>Each agency Year 2000 Project Manager will need to develop procedures for collecting and presenting the required information to agency executives. The Michigan Year 2000 Project Office will be researching the same type of information on a more global, statewide level.</p>	
Deliverables	Responsibilities
<ul style="list-style-type: none"> ▪ Year 2000 Business Insurance Review ▪ Year 2000 Business Continuation Plan 	<ul style="list-style-type: none"> ▪ Agency Year 2000 Project Managers (D3) ▪ Agency Business Insurance Issues Coordinator (D16) ▪ Project Office Business Insurance Issues Coordinator (P10)

A more thorough discussion of quality assurance may be found in the Year 2000 Software Quality Assurance Program (SQAP), Volume Three of the Michigan Year 2000 Remediation Framework. Please note that in the task descriptions below, the index numbers associated with a deliverable reference the task in which they are created followed by a unique alphabetic code.

The diagram below depicts the tasks and relationship between the tasks in Activity 8:

Activity 8 –Quality Assurance



Appendix A of this Volume contains a larger, more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. The following pages describe the tasks in Activity 8 – Quality Assurance, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task.

Michigan Year 2000 Remediation Methodology	
8.1	Activity: Quality Assurance
	Task: Conduct Agency Mobilization Quality Assurance
Description	
<p>The objective of Task 8.1 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 2 – Agency Mobilization. Many of the tasks in Activity 2 are packaged and presented in a final form in the agency Year 2000 Implementation Strategy Plan (ISP).</p> <p>Key Activity 2 deliverables to be reviewed:</p> <ul style="list-style-type: none"> ▪ Deliverable 2.7a. Agency Year 2000 Implementation Strategy Plan (ISP) 	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Department Agency Mobilization QA Assessment 	<ul style="list-style-type: none"> ▪ Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.2	Activity: Quality Assurance
	Task: Conduct Detailed Assessment Quality Assurance
Description	
<p>The objective of Task 8.2 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 3 – Detailed Assessment.</p> <p>Key Activity 3 deliverables to be reviewed:</p> <ul style="list-style-type: none"> ▪ Deliverable 16.a Testing and Validation Strategy ▪ Deliverable 3.17a Implementation Strategy and Approach ▪ Deliverable 3.19a Final Year 2000 Plan and Timeframe 	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Detailed Assessment QA Assessment 	<ul style="list-style-type: none"> ▪ Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.3	Activity: Quality Assurance
	Task: Conduct Code Modification Quality Assurance
Description	
<p>The objective of Task 8.3 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 4 – Code Modification.</p> <p>Key Activity 4 deliverables to be sampled:</p> <ul style="list-style-type: none"> ▪ Deliverable 4.1a. Baseline Scan ▪ Deliverable 4.2a. Renovated Application System ▪ Deliverable 4.3a. Application Replacement/Remediation Coordination Plan ▪ Deliverable 4.4a. Application Replacement/Remediation Status Reporting 	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Code Modification QA Assessment 	<ul style="list-style-type: none"> ▪ Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology

8.4

Activity: Quality Assurance

Task: Conduct Validation Quality Assurance

Description

The objective of Task 8.4 is to conduct *product level* quality assurance on the deliverables from Activity 5 – Validation.

Key Activity 5 deliverables to be sampled:

- Deliverable 5.1a. Compliance Unit Schedule and Test Plan
- Deliverable 5.2a. Established Testing Environment
- Deliverable 5.2c. Incident Tracking Procedure
- Deliverable 5.3a. Test Data and Scripts
- Deliverable 5.4a. Remediated Source Code Modified to be in Sync with the Production Source Code
- Deliverable 5.5a. Unit and System Tested Compliance Unit
- Deliverable 5.6a. Fully Tested Compliance Unit

Deliverables

Responsible Party

- Validation QA Assessment

- Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.5	Activity: Quality Assurance
	Task: Conduct Implementation Quality Assurance
Description	
<p>The objective of Task 8.5 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 6 – Implementation.</p> <p>Key Activity 6 deliverables to be reviewed:</p> <ul style="list-style-type: none"> ▪ Deliverable 6.8a. Certified Year 2000 Compliance Units <p>Other key Activity 6 deliverables may be sampled as deemed necessary.</p>	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Implementation QA Assessment 	<ul style="list-style-type: none"> ▪ Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.6	Activity: Quality Assurance
	Task: Conduct Program Management Quality Assurance
Description	
<p>The objective of Task 8.6 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 7 – Program Management.</p> <p>Key Activity 7 deliverables to be reviewed:</p> <ul style="list-style-type: none"> ▪ Deliverable 7.3a. Year 2000 Project Status Report 	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Program Management QA Assessment 	<ul style="list-style-type: none"> ▪ Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.7	Activity: Quality Assurance
	Task: Conduct Risk Management Quality Assurance
Description	
<p>The objective of Task 8.7 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 9 – Risk Management.</p> <p>These various Risk Management reports and metrics are reviewed.</p>	
Deliverables	Responsible Party
<ul style="list-style-type: none"> Risk Management QA Assessment 	<ul style="list-style-type: none"> Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.8	Activity: Quality Assurance
	Task: Conduct Awareness & Communication Quality Assurance
Description	
<p>The objective of Task 8.8 is to conduct <i>product level</i> quality assurance on the deliverables from Activity 10 – Awareness & Communication.</p> <p>Key Activity 10 deliverables to be reviewed:</p> <ul style="list-style-type: none"> ▪ Deliverable 10.2d. Newsletter ▪ Deliverable 10.5a. Reference Material Library ▪ Deliverable 10.6a. “Best Practice” Procedures ▪ Deliverable 10.7a. Procedures to Exchange Information with Agencies ▪ Deliverable 10.8a. Year 2000 Update Report 	
Deliverables	Responsible Party
<ul style="list-style-type: none"> ▪ Awareness & Communication QA Assessment 	<ul style="list-style-type: none"> ▪ Quality Assurance Analyst (D11)

Michigan Year 2000 Remediation Methodology	
8.9	Activity: Quality Assurance
	Task: Certify Agency Processes, Procedures and Practice Aids
Description	
<p>The objective of Task 8.9 is to certify an agency's processes, procedures, and practice aids. If the agency elects to use a Methodology other than the Michigan Year 2000 Remediation Methodology, the Methodology must be certified. It is the agency's responsibility to compare and contrast their Methodology with the Michigan Year 2000 Remediation Methodology and to demonstrate to the Michigan Year 2000 Project Office Quality Assurance staff that the Methodology is complete.</p> <p>The Michigan Year 2000 Remediation Methodology was evaluated against two standards. ITAA2000 from the Information Technology Association of America (ITAA) is a certification program that provides the SOM with the opportunity to have a neutral, objective third-party evaluation of the SOM's Year 2000 processes and methods. ITAA2000 is a certification process that certifies the <i>methodology</i> used for Year 2000 remediation, not a specific <i>application</i>. The Michigan Year 2000 Remediation Methodology has been carefully compared with the ITAA2000 certification process to confirm that the Methodology is complete.</p> <p>The Michigan Year 2000 Remediation Methodology has also been compared to the Software Engineering Institute's (SEI) Capability Maturity Model (CMM) to validate that the Methodology can be considered a mature software process.</p>	
Deliverables	Responsible Party
<ul style="list-style-type: none"> Agency Processes, Procedures and Practice Aids Certification Report 	<ul style="list-style-type: none"> Quality Assurance Analyst (D11) Quality Assurance Specialists (P5)

Michigan Year 2000 Remediation Methodology	
8.10	Activity: Quality Assurance
	Task: Conduct Process Assurance Reviews and Audits
Description	
<p>The objective of Task 8.10 is to conduct <i>process level</i> quality assurance on the renovation and management processes employed by the agency, based on the Capability Maturity Model (CMM). One of the key elements of the review is to validate that the organization is effectively applying the Michigan Year 2000 Remediation Methodology, Procedures and Practice Aids.</p> <p>For further information on Process Assurance, see the Year 2000 Software Quality Assurance Program (SQAP), Volume Three of the Michigan Year 2000 Remediation Framework.</p>	
Deliverables	Responsible Party
<ul style="list-style-type: none"> Process Assurance Assessment 	<ul style="list-style-type: none"> Quality Assurance Analyst (D11) Quality Assurance Specialist (P5)

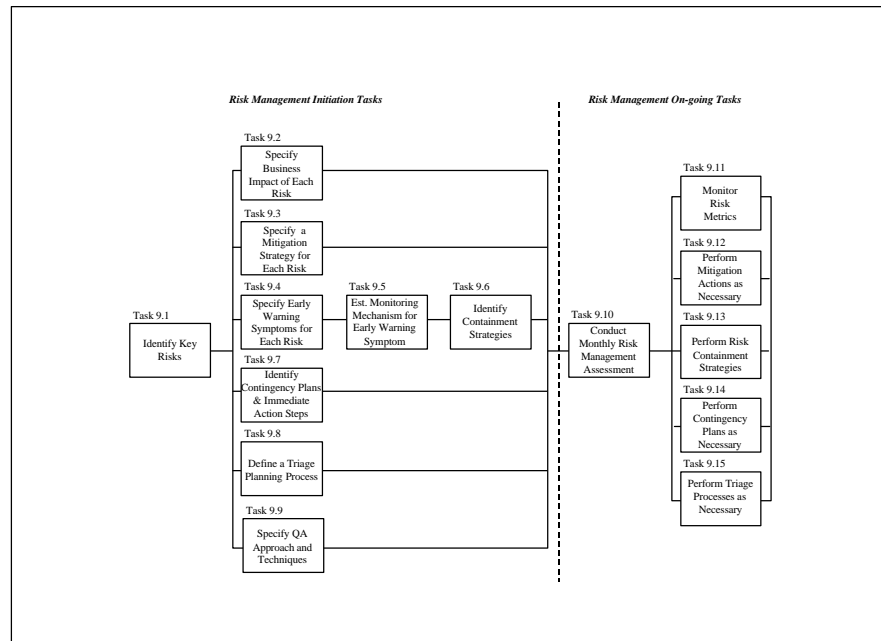
<i>Michigan Year 2000 Remediation Methodology</i>	
8.11	Activity: Quality Assurance
	Task: Prepare Periodic Quality Assurance Reports
<i>Description</i>	
<ul style="list-style-type: none"> The objective of Task 8.11 is to prepare, publish and distribute periodic Quality Assurance Reports. 	
<i>Deliverables</i>	<i>Responsible Party</i>
<ul style="list-style-type: none"> Quality Assurance Report 	<ul style="list-style-type: none"> Quality Assurance Analyst (D11) Quality Assurance Specialist (P5)

XI. Activity 9 - Risk Management

The objective of Activity 9 is to minimize the impact that the Year 2000 Projects will have on the State, by identifying risks early and mitigating their impact.

The diagram below depicts the tasks and relationship between the tasks in Activity 9:

Activity 9 –Risk Management



Appendix A of this Volume contains a larger, more detailed graphical representation of the Michigan Year 2000 Remediation Methodology.

The Risk Management Initiation Tasks (Tasks 1 – 9) are the tasks required to develop the Year 2000 Risk Management Manual. The Risk Management On-going Tasks (Tasks 10 – 15) are the tasks that the agencies conduct to monitor each risk and to properly address risks as they occur.

The following pages describe the tasks in Activity 9 – Risk Management, the list of deliverables to be produced during the execution of the task and the roles responsible for performing each task:

Michigan Year 2000 Remediation Methodology

9.1

Activity: Risk Management

Task: Identify Key Risks

Description

The objective of Task 9.1 will be to identify and develop a list of the most critical risk factors for the Year 2000 project. Once agreed upon, these risks will become the primary focus of attention to prevent the Year 2000 project from going out of control. Typical risks associated with a project of this magnitude are:

- Staffing, employee retention, and recruiting of qualified personnel.
- Insufficient funding.
- Inadequate testing.
- Implementation scheduling.
- Potential disruption in service delivery.
- Failure rate of large projects.
- Defining responsibility for non-IT infrastructure.
- Competition for technology resources from other critical mandates.
- Inadequate inventory of IT assets.
- Date sensitive mission critical applications.
- Legal exposure.

Other risks may also be identified and described, but only the most significant risks will be fully documented in terms of business impact, migration strategies, early warning symptoms, contingency plans, and immediate action steps.

<i>Michigan Year 2000 Remediation Methodology</i>	
9.1 (continued)	Activity: Risk Management
	Task: Identify Key Risks
<i>Description</i>	
<i>Deliverables</i>	<i>Responsible Party</i>
<ul style="list-style-type: none"> Initial Year 2000 Risk Management Manual with Key Risks Identified 	<ul style="list-style-type: none"> Financial and Risk Management Officer (P3) Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

9.2

Activity: Risk Management

Task: Specify Business Impact of Each Risk

Description

The objective of Task 9.2 is to specify the business impact of each Year 2000 risk as identified in the Year 2000 Risk Management Plan. Urgency and risk must be associated with the prospective damage that can result. Documenting and quantifying the impact of a potential event will provide decision makers with the information needed to set priorities.

Risks that have a negative business impact tend to occur once the project is well underway, and, if left unattended may result in project failure. When risks are identified, categorized, prioritized and incorporated into the appropriate level of the project plan, careful monitoring of events will reduce the inherent risk. This incorporation requires documenting a specific mitigation strategy and an early warning symptom for each identified risk. In turn, each early warning symptom requires a monitoring mechanism to detect it as soon as possible.

Deliverables

- Updated Year 2000 Risk Management Manual with Business Impact of Each Risk

Responsible Party

- Financial and Risk Management Officer (P3)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

9.3

Activity: Risk Management

Task: Specify a Mitigation Strategy for Each Risk

Description

The Objective of Task 9.3 is to specify an associated mitigation strategy for each significant risk as identified in the Year 2000 Risk Management Plan. This mitigation strategy will specify an approach, technique, or plan to relieve or reduce a given risk. Included in the mitigation strategy are:

- Careful advanced planning and continual monitoring of resources.
- Development of creative methods for solving resource shortages.
- Addressing crises immediately and firmly.
- Establishing contingency resources for emergency situations.
- Discontinuation of non-essential operations.
- Resource redirection.
- Possible use of a disaster recovery facility.
- Development of specific examples for project staff to follow.

These are only some of many strategies that can be employed to reduce risk. Situations will arise during the implementation phase of the project where other spontaneous or creative solutions are discovered.

Deliverables

- Updated Year 2000 Risk Management Manual with Mitigation Strategy

Responsible Party

- Financial and Risk Management Officer (P3)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

9.4

Activity: Risk Management

Task: Specify Early Warning Symptoms for Each Risk

Description

The objective of Task 9.4 is to specify the early warning symptoms for each risk as defined in the Year 2000 Risk Management Plan. An Early Warning Symptom is a specific and measurable event or series of events that serves as an indicator that the occurrence of a given risk is eminent. For each event and associated identified risk, deadlines and due-dates are determined. These events are monitored daily to determine that the schedule is being maintained and that the resources are available. At any point during implementation, early warning signals may be triggered by the failure to accomplish a task at a predetermined time or by a change in project scope that impacts future events.

Deliverables

- Updated Year 2000 Risk Management Manual with Mitigation Strategy

Responsible Party

- Financial and Risk Management Officer (P3)
- Agency Year 2000 Project Manager (D3)

Michigan Year 2000 Remediation Methodology

9.5

Activity: Risk Management

Task: Establish Monitoring Mechanism for Early Warning Symptom

Description

The objective of Task 9.5 is to establish a Monitoring Mechanism for the Early Warning Symptoms identified in the Year 2000 Risk Management Plan. This monitoring will be continuous throughout the life cycle of the Year 2000 project. The primary monitoring tool will be the Year 2000 Project Status Reporting System and the Year 2000 Control Board. Information updated by the agencies will be reviewed and analyzed in aggregate to determine if any early warning symptoms need attention.

Deliverables

- Updated Year 2000 Risk Management Manual with Mechanisms to Monitor Early Warning Symptoms

Responsible Party

- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.6

Activity: Risk Management

Task: Identify Containment Strategies

Description

The objective of Task 9.6 is to identify Containment Strategies for the Year 2000 Project. Containment strategies are actions designed to prevent new Year 2000 problems from surfacing while enroute to compliance or after compliance is achieved. They are a “line in the sand” that says, “from now on, this problem will not get worse.”

This action will prevent the frustration of the problem from growing while in midst of a fix, or the re-introduction of non-compliant code after compliance is achieved. Examples of common Containment Strategies include:

- Vendor selection, procurement and contract language.
- Year 2000 programming standards.
- Standard exceptions for current remediation efforts.
- Construction and maintenance on anti-non-compliant data firewalls.
- Insistence on use of four digit years when referring to dates.
- Elimination of pre-printed “19” on all documents.

Deliverables

Responsible Party

- Updated Year 2000 Risk Management Manual with Containment Strategies

- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.7

Activity: Risk Management

Task: Identify Contingency Plans & Immediate Action Steps

Description

The Objective of Task 9.7 is to identify Contingency Plans and Immediate Action Steps for all risks defined in the Year 2000 Risk Management Plan. Unlike routine system development or maintenance efforts where schedule slippage is non-fatal and common, the Year 2000 Project must be completed on time. Agencies are to develop realistic contingency plans, including the development and activation of manual or contract procedures, to ensure the continuity of their core business processes.

All year 2000 compliant systems, including the renovated and replaced systems and related databases, should have disaster recovery plans for the restoration of operations and data in case of extended outage, sabotage, or natural disaster.

Deliverables

- Updated Year 2000 Risk Management Manual with Contingency Plans & Immediate Action Steps

Responsible Party

- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.8

Activity: Risk Management

Task: Define a Triage Planning Process

Description

The objective of Task 9.8 is to define the triage planning process in the Year 2000 Risk Management Plan. Triage is defined as a system designed to produce the greatest benefit from limited treatment facilities for battlefield casualties. Full and immediate medical treatment is provided to those who may survive and not to those who do not have a chance of survival even if treated, and not to those who will survive anyway without treatment. As applied to the Year 2000 Project, concentrated effort for Year 2000 compliance will be applied to those systems and applications that have the best chance for completion in time for the Year 2000.

Recommended steps to accomplish this are:

- Plan not to finish all applications.
- Identify mission critical functions of the State.
- Identify application systems for the mission critical functions.
- Prioritize mission critical systems.
- Define essential functions or applications.
- Define those functions and systems that an agency could live without.
- Ignore everything except the first group of mission critical applications.
- Define non-essential functionality within an application.

Deliverables

- Updated Year 2000 Risk Management Manual with Triage Planning Process

Responsible Party

- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.9

Activity: Risk Management

Task: Specify QA Approach and Techniques

Description

The objective of Task 9.9 is to define the quality assurance approach and techniques for the Year 2000 Risk Management Plan. Since quality assurance will be established as a formal function in the Year 2000 Project Office, the Risk Management Plan will adhere to the processes as established for the quality assurance function. These processes include the following steps:

- Formalized QA process.
- Responsible party to perform QA for the Year 2000 Project Office.
- Establish deliverables from each project for QA reviewer.
- QA reviewer examines all components and changes.
- QA reviewer reports inconsistencies.

The Risk Management Plan will also reference the quality assurance process developed and applied by agencies, as appropriate.

Deliverables

- Updated Year 2000 Risk Management Manual with Quality Assurance Approach and Techniques

Responsible Party

- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.10

Activity: Risk Management

Task: Conduct Monthly Risk Management Assessment

Description

The objective of Task 9.10 is to conduct the Monthly Risk Management Assessment by gathering the risk management metrics from each agency. Each agency will complete a monthly Risk Management Assessment form within the Year 2000 Progress Reporting System each month. The information is consolidated and rolled-up for analysis and reporting purposes.

Deliverables

- Monthly Risk Management Assessment

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.11

Activity: Risk Management

Task: Monitor Risk Metrics

Description

The objective of Task 9.11 is to monitor the risk metrics as defined in the Year 2000 Risk Management Manual. Significant variances from plan are reported to the Year 2000 Project Office. All team members will be charged with the task of identifying and monitoring risks. All Michigan Year 2000 Project Office staff members are responsible for determining methods for avoiding or at least mitigating each risk, and for developing contingency plans in case that risk materializes.

Deliverables

- Monthly Risk Management Assessment Metrics Report

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.12

Activity: Risk Management

Task: Perform Mitigation Actions as Necessary

Description

The objective of Task 9.12 is to perform the mitigation actions as required and which are defined in the Year 2000 Risk Management Program. The Year 2000 Project Office will report all actions through the Year 2000 Project Status Reporting System and the Year 2000 Electronic Control Board after approval.

Deliverables

- Updated Year 2000 Project Status Reports with Risk Management Mitigation Information

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.13

Activity: Risk Management

Task: Perform Risk Containment Strategies

Description

The objective of Task 9.13 is to perform risk containment strategies as defined in the Year 2000 Risk Management Plan throughout the duration of the Year 2000 Project. Reporting to and approval by the Year 2000 Project Office is required.

Deliverables

- Updated Year 2000 Project Status Reports with Risk Management Containment Information

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.14

Activity: Risk Management

Task: Perform Contingency Plans as Necessary

Description

The objective of Task 9.14 is to perform the necessary contingency plans as defined in the Year 2000 Risk Management Plan throughout the duration of the Year 2000 Project. Reporting to and approval by the Year 2000 Project Office is required.

Deliverables

- Updated Year 2000 Project Status Reports with Risk Management Contingency Plan Information

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Financial and Risk Management Officer (P3)

Michigan Year 2000 Remediation Methodology

9.15

Activity: Risk Management

Task: Perform Triage Processes as Necessary

Description

The objective of Task 9.14 is to perform the necessary triage processes as defined in the Year 2000 Risk Management Plan throughout the duration of the Year 2000 Project. Reporting to and approval by the Year 2000 Project Office is required.

Deliverables

- Updated Year 2000 Project Status Reports with Risk Management Triage Information

Responsible Party

- Agency Year 2000 Project Manager (D3)
- Financial and Risk Management Officer (P3)

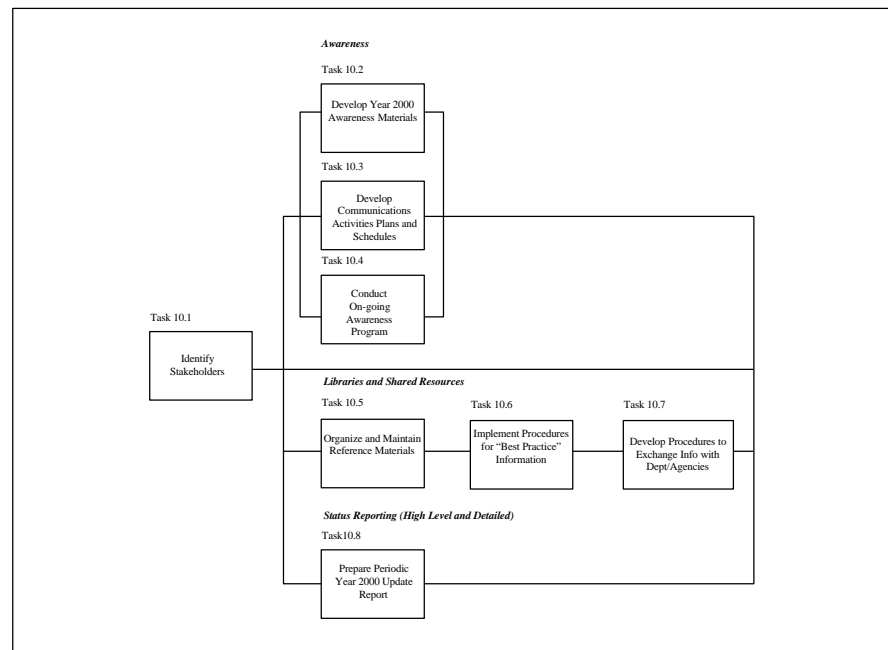
XII. Activity 10 - Awareness and Communication

The objective of the Activity 10 is to raise the Year 2000 awareness across the State, and to develop an extended communications system that will allow the State Agencies to share status and solutions. The Michigan Year 2000 Project Office will accomplish this by:

- Serving as point of contact for answering questions on Statewide Year 2000 efforts.
- Keeping legislature and senior leadership Informed on Year 2000 progress, funding and risks.
- Serving as an information clearinghouse for Year 2000 reference materials and best practice information.
- Keeping local governments and other trading partners informed on Year 2000 issues.

The diagram on the following page depicts graphically the tasks within Activity 10 – Awareness and Communication.

Activity 10 –Awareness and Communication



Appendix A of this Volume contains a larger, more detailed graphical representation of the Michigan Year 2000 Remediation Methodology. The following pages describe the tasks in Activity 10 – Awareness and Communication, the list of deliverables to be produced during the execution of the task, and the roles responsible for performing each task.

Michigan Year 2000 Remediation Methodology

10.1

Activity: Awareness and Communication

Task: Identify Stakeholders

Description

The objective of Task 10.1 is to identify the key stakeholders. To accomplish this, answer the following questions.

- Who cares?
- What do they want to know from us?
- What do we need from them?
- How can they best be informed?

Deliverables

- Agency Stakeholders List

Responsible Party

- State of Michigan Chief Information Officer (CIO)
- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.2

Activity: Awareness and Communication

Task: Develop Year 2000 Awareness Materials

Description

The objective of Task 10.2 is to develop Year 2000 awareness materials that may be communicated to all interested parties through a number of different channels. Some examples of Year 2000 awareness materials that could be developed are:

- Reports of agency progress and status.
- Web Site.
- Distribution List
 - Y2k Project Managers.
 - Executive Sponsors.
 - Legislators and Senior Leadership.
 - Local government and school district Year 2000 contacts.
 - Vendors.
 - Other trading partners.
- Periodic Year 2000 newsletter.

Deliverables

- Progress and Status Reports for Distribution
- Michigan Year 2000 Web Site
- Distribution Lists
- Newsletter

Responsible Party

- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.3

Activity: Awareness and Communication

Task: Develop Communications Activities, Plans and Schedules

Description

The objective of Task 10.3 is to develop communications activities, plans and schedules. The following is a list of sample activities for a communications plan.

- Set up a Web Site.
- Build Agency FTP sites.
- Build awareness letter template.
- Determine format.
- Newsletter.
- Assessment (updates).
- Agency exception report.
- Monthly status reports.
- Build Year 2000 distribution list.
- Allocate space for physical Year 2000 library.
- Define toolkit distribution plan.
- Schedule Project Manager sessions.

Michigan Year 2000 Remediation Methodology

10.3 (continued)

Activity: Awareness and Communication

Task: Develop Communications Activities, Plans and Schedules

Description

- Build Issue Log and Issue Submission Form.
- Build Year 2000 contact database.
- Obtain contracts/warranty language from legal counsel.
- Schedule awareness programs.
- Build Year 2000 resource database.

The list can be revised as appropriate to fit a particular situation. After the list is finalized, the activities are planned and scheduled for completion.

Deliverables

- Awareness and Communication Activities, Plans and Schedules

Responsible Party

- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.4

Activity: Awareness and Communication

Task: Conduct On-going Awareness Program

Description

The objective of Task 10.4 is to conduct on-going awareness programs to increase the level of Year 2000 awareness across the organization. The following are some recommendations for conducting on-going awareness programs:

- Seminars for continuing awareness.
- Informational updates to senior leadership from the State's CIO.
- "Urgent Message to the CEO" awareness letter.
- Electronic newsletters.
- Executive briefings.

It is extremely critical to raise the level of Year 2000 awareness. Increased awareness will bring an increased commitment to successfully complete the Year 2000 Remediation.

Deliverables

- On-going Awareness Program
- Increased SOM Year 2000 Awareness

Responsible Party

- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.5

Activity: Awareness and Communication

Task: Organize and Maintain Reference Materials

Description

The objective of Task 10.5 is to develop a physical and electronic reference library. A physical location for a Year 2000 reference library is identified. Procedures are established to receive, log, and index Year 2000 reference materials (e.g., tool descriptions, methodologies, and Year 2000 compliance information). In addition, a Year 2000 Web Site with electronic links to reference materials could be established.

The following is a list of links to specific Year 2000 information that should be included in the Web Site:

- Unisys.
- Bull.
- IBM.
- Federal Government.
- Tools and techniques.
- IT contracts/warranty language.
- Non-IT contracts/warranty language.
- List of available resource cooperative contracts.
- "Best practice" information.

Deliverables

- Reference Material Library
- Web Site with Electronic Reference Library

Responsible Party

- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.6

Activity: Awareness and Communication

Task: Implement Procedures for “Best Practices” Information

Description

The objective of Task 10.6 is to implement within the physical and electronic reference library a site where “Best Practice” information may be stored. The Year 2000 Project Office is relying on the agencies to identify innovative “Best Practice” methods for solving their Year 2000 Remediation problems. The SOM supports many platforms and languages. In many instances, for languages that are less frequently used, no remediation solutions exist. If you are remediating source code written in a language that is unsupported, document your procedures and submit them to the Michigan Year 2000 Project Office Awareness and Communication Coordinator. These solutions will be reviewed, further documented (if necessary) and incorporated into the physical and electronic reference library.

Additionally, information about product/vendor tests, lessons learned, and vendor product compliance needs to be communicated to the Michigan Year 2000 Project Office Awareness and Communication Coordinator so that the information may be shared with other agencies.

Deliverables

- “Best Practice” Procedures

Responsible Party

- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.7

Activity: Awareness and Communication

Task: Develop Procedures to Exchange Information with Agencies

Description

The objective of Task 10.7 is to encourage the exchange of information between agencies. Critical to achieving Year 2000 compliance across the State is two-way communications. A number of different channels, activities and plans have been documented in Activity 10 to communicate Year 2000 information to the agencies. Procedures and methods to encourage the flow of information from the agency to the Michigan Year 2000 Project Office are needed. As projects fall off schedule, there is a tendency to reduce the information flow from the agency to the Michigan Year 2000 Project Office. It is important to stress the necessity of continuing open communications.

Additionally, the Michigan Year 2000 Project Office encourages agencies to recognize innovative “Best Practice” solutions. These should be documented and submitted to the Michigan Year 2000 Project Office so that they may be shared statewide.

Deliverables

Responsible Party

- Procedures to Exchange Information with Agencies

- Awareness and Communication Coordinator (P4)
- Agency Year 2000 Project Manager (D3)
- Agency Awareness and Communication Coordinator (D14)

Michigan Year 2000 Remediation Methodology

10.8

Activity: Awareness and Communication

Task: Prepare Periodic Year 2000 Update Report

Description

The objective of Task 10.8 is to develop a periodic Year 2000 Update Report. Consider including the following:

- Purpose of Assessment Update Report.
- Reporting period (monthly for critical compliance units, quarterly for non-critical compliance units).
- Risk Assessment.
- Agency resource utilization.
- Agency project plan progress.
- Critical systems.
- Inventory status.
- Assessment of Agency systems.
- Performance to plan.
- Resource utilization.
- Agency exception report (monthly or on request).
- Agencies in danger.
- Areas of deficiency.

Michigan Year 2000 Remediation Methodology

10.8
(continued)

Activity: Awareness and Communication

Task: Prepare Periodic Year 2000 Update Report

Description

Deliverables

- Year 2000 Update Report

Responsible Party

- State of Michigan Chief Information Officer (CIO)
- Michigan Year 2000 Project Office Director (P1)
- Awareness and Communication Coordinator (P4)
- Agency Awareness and Communication Coordinator (D14)

XIV. Deliverables by Activity and Task

The following is a list of deliverables by activity and task:

1. Statewide Mobilization

Project Office Initiation Tasks

- 1.1. Establish Michigan Year 2000 Project Office
 - 1.1a. Project Office Vision
 - 1.1b. Project Office Workplan and Budget
- 1.2. Obtain Support from Executive Management
 - 1.2a. Executive Management Support Plan
- 1.3. Identify Department/Agency Year 2000 Managers
 - 1.3a. Year 2000 Resource Directory
- 1.4. Conduct Statewide Year 2000 Assessment (Keane, Inc.)
 - 1.4a. Year 2000 Assessment Report (Keane, Inc.)

Project Office Centralized Tasks

- 1.5. Establish Oversight Structure
 - 1.5a. Year 2000 Project Organization Structure
- 1.6. Define Year 2000 Compliance
 - 1.6a. Year 2000 Compliance Criteria (see DMB Procedure 1310.30)
- 1.7. Initiate Year 2000 Awareness and Communication Program
 - 1.7a. Michigan Year 2000 Remediation Framework - Awareness & Communication Program (Volume 5)
- 1.8. Extend/Customize Michigan Year 2000 Remediation Methodology and Practice Aids
 - 1.8a. Extended and Customized Michigan Year 2000 Remediation Methodology
 - 1.8b. Procedure and Practice Aids

- 1.9. Evaluate and Select Tools and Technologies
 - 1.9a. Year 2000 Tools Selection Classes and Types
 - 1.9b. Year 2000 Selection Criteria
 - 1.9c. List of Year 2000 Software Products by Platform and Language
 - 1.9d. Recommended Year 2000 Tool Purchases
- 1.10. Establish Software Factory
 - 1.10a. Software Factory Implementation Plan
 - 1.10b. Software Factory Implementation ITB
 - 1.10c. Software Factory Procedure Manual
- 1.11. Develop and Implement Statewide Year 2000 Project Reporting System
 - 1.11a. Year 2000 Project Reporting Database Design (in Microsoft Access)
 - 1.11b. Year 2000 Project Reporting System
 - 1.11c. Year 2000 Project Reporting System Training
 - 1.11d. Year 2000 Project Reporting System Documentation and User Guides
- 1.12. Provide Training to Agency Personnel
 - 1.12a. Michigan Year 2000 Remediation Methodology Training
 - 1.12b. Year 2000 Project Reporting System Training
 - 1.12c. Software Factory Training
 - 1.12d. Other Training as Required

2. Department/Agency Mobilization

- 2.1. Develop Year 2000 Strategy and Approach
 - 2.1a. Year 2000 Strategy and Approach
- 2.2. Review and Complete Inventory from Assessment
 - 2.2a. Updated Year 2000 Assessment Report
- 2.3. Assess the Impact of Year 2000 Induced Failures
 - 2.3a. Year 2000 Induced Failure Report
- 2.4. Prioritize Systems Based on Risks and Triage Assessment
 - 2.4a. Application Systems Inventory in Implementation Priority Sequence Report

- 2.5. Identify Year 2000 Staffing Requirements
 - 2.5a. Resource Utilization Plan
- 2.6. Organize Year 2000 Project Team
 - 2.6a. Project Team Organization Chart
 - 2.6b. Project Team Roles and Responsibilities
- 2.7. Develop Department/Agency Year 2000 Plan
 - 2.7a. Year 2000 Implementation Strategy Plan
- 2.8. Prepare Budget for Year 2000 Activities
 - 2.8a. Year 2000 Project Plan Cost and Resource Estimates

3. Detailed Assessment

- 3.1. Confirm Application Systems and Subsystems by Department/Agency
 - 3.1a. Confirmed Department/Agency Application System/Subsystem Organization Structure Report
- 3.2. Determine Preliminary Route (Renovate/Retire/Replace/Verify/Compliant)
 - 3.2a. Updated Department/Agency Application System/Subsystem Organization Structure Report

Custom Application Software - Software Factory and Manual Analysis

- 3.3. Package System Components for Scanning
 - 3.3a. Inventory of Jobs Assigned to an Application System and Subsystem
 - 3.3b. Inventory of Transactions Assigned to an Application System and Subsystem
 - 3.3c. Inventory of Programs Assigned to an Application System and Subsystem
 - 3.3d. Inventory of Other System Components Assigned to an Application System and Subsystem
 - 3.3e. Inventory of Inactive Jobs, Transactions and Programs
- 3.4. Scan System Components
 - 3.4a. Loaded Repositories
 - 3.4b. Inventory of Loaded Components
- 3.5. Analyze Software Inventory for Completeness and Problems
 - 3.5a. Assessment of the Software Inventory Quality
- 3.6. Make Revisions

- 3.6a. Revised Inventory lists
- 3.7. Identify Potential Date Elements Requiring Remediation
 - 3.7a. Inventory of "Potential Date Elements" Impacted
 - 3.7b. Inventory of Batch Jobs, Transactions and Programs Impacted
- 3.8. Drop False Positive Date Elements
 - 3.8a. Revised List of Date Elements Impacted
 - 3.8b. Revised Application System and Subsystem Summary Metrics
- 3.9. Identify Data Stores Requiring Remediation
 - 3.9a. Inventory of Data Stores Requiring Remediation
- 3.10. Identify Interface and Data Exchange Issues
 - 3.10a. Inventory of System Interfaces and the Systems with which they Interface
- 3.11. Define Compliance Units
 - 3.11a. Compliance Unit Report in Implementation Priority Sequence
- 3.12. Determine Remediation Strategy (Windowing/Field Expansion)
 - 3.12a. Remediation Strategy for Major Dates within an Application System

Vendor Supplied Application Software Package

- 3.13. Analyze Vendor Products for Year 2000 Compliance
 - 3.13a. Vendor Software Products Compliance Status

Infrastructure

- 3.14. Identify Non-Compliant Equipment and Systems
 - 3.14a. Non-Compliant Equipment and Systems Inventory
- 3.15. Assess Impact on Application Software
 - 3.15a. Non-Compliant Equipment and Systems Impact on the SOM Application Systems

Strategy Development

- 3.16. Develop Testing and Validation Strategies
 - 3.16a. Testing and Validation Strategy

- 3.17. Develop Implementation Strategy and Approach
 - 3.17a. Implementation Strategy and Approach
- 3.18. Finalize Route (Renovate/Retire/Replace/Verify/Compliant) & Confirm Priorities
 - 3.18a. Updated Department/Agency System/subsystem Organization Structure
 - 3.18b. Final Compliance Unit Report in Implementation Priority Sequence
- 3.19. Revise Year 2000 Plan and Timeframes
 - 3.19a. Final Year 2000 Project Plan
- 3.20. Validate Initial Year 2000 Estimates (Keane, Inc.)
 - 3.20a. Revised Estimates of the Year 2000 Costs
 - 3.20b. Additional Funding Request (if required)

4. Code Modification

Year 2000 Conversion

- 4.1. Create Baseline Scan
 - 4.1a. Baseline Scan
- 4.2. Renovate Application Source
 - 4.2a. Renovated Application System
 - 4.2b. Quality Assurance Review of the Renovated Application Source

Year 2000 Package Upgrade/Replacement

- 4.3. Acquire Application System
 - 4.3a. Application Replacement/Remediation Coordination Plan
- 4.4. Customize the Application System
 - 4.4a. Application Replacement/Remediation Status Reporting

Rewrite

- 4.5. Prepare Design Specifications
 - 4.5a. Application Development/Remediation Coordination Plan

4.6. Develop Application

4.6a. Application Development/Remediation Joint Status Reporting

Retirement

4.7. Retire the System

4.7a. Retired Systems Interface Disposition Analysis

Year 2000 Code Modification Common Tasks

4.8. Develop Conversion Programs

4.8a. Smart Bridges for Selected Files

4.8b. Files for Selected Files

4.8c. Data Conversion Programs for Selected Files

4.9. Modify/Develop Interfaces

4.9a. Smart Bridges for Interface Files and Databases

4.9b. Files for Interface Files and Databases

4.9c. Data Conversion Programs for Interface Files and Databases

4.10. Document Code and System Changes

4.10a. Revised Documentation

5. Validation (Unit and System Testing)

5.1. Develop and Document Test & Compliance Plans and Schedules

5.1a. Compliance Unit Schedule and Test Plan

5.2. Establish Year 2000 Test Environment

5.2a. Established Testing Environment

5.2b. Language and platform specific Testing Practice Aids

5.2c. Incident Tracking Procedure

5.3. Develop Test Beds and Scripts

5.3a. Test Data and Scripts

5.4. Synchronize and Migrate Development Source Code

5.4a. Remediated Source Code modified to be in sync with the Production Source Code

5.5. Perform Unit, Integration, and System Testing

- 5.5a. Unit and System Tested Compliance Unit
- 5.6. Perform Acceptance Testing
 - 5.6a. Fully Tested Compliance Unit

6. Implementation

Implementation Initiation Tasks

- 6.1. Define Transition Environment and Procedures
 - 6.1a. Transition Environment and Procedures
- 6.2. Develop Implementation Schedule and Plans
 - 6.2a. Implementation Schedule and plan
- 6.3. Synchronize and Migrate Development Source Code
 - 6.3a. Remediated Source Code modified to be in sync with the Production Source Code

Implementation On-going Tasks

- 6.4. Resolve Data Exchange Issues and Interagency Concerns
 - 6.4a. Identification and review of all Data Exchange and Inter-Department/Agency Concerns
- 6.5. Resolve and Convert Database and Archives
 - 6.5a. Inventory of Converted Databases and Files
 - 6.5b. Converted Databases and Files
- 6.6. Develop Fallback Plan
 - 6.6a. Contingency Plan of manual procedures to ensure business continuity
 - 6.6b. Procedures to Restore a Prior Release of a Production Application System
- 6.7. Confirm Infrastructure Compliance
 - 6.7a. Compliant Infrastructure Components Review
- 6.8. Conduct Compliance Unit Year 2000 Certification
 - 6.8a. Certified Year 2000 Compliance Units
- 6.9. Implement Renovated and Replaced System
 - 6.9a. Implemented Application System

- 6.9b. Summary of Issues Encountered During Implementation
- 6.10. Perform Post Implementation Monitoring
 - 6.10a. Post Implementation Support as Required
 - 6.10b. Summary of Issues Encountered During Post Implementation

7. Program Management

- 7.1. Measure Project Results
 - 7.1a. Year 2000 Process Evaluation Checklist
 - 7.1b. Year 2000 Measurement Guideline
- 7.2. Identify and Resolve Issues
 - 7.2a. Year 2000 Project Status Report Section IV
- 7.3. Prepare Status Reports
 - 7.3a. Year 2000 Project Status Report
 - 7.3b. Year 2000 Control Board
 - 7.3c. Year 2000 Electronic Control Board
- 7.4. Manage Workload and Assignments
 - 7.4a. Revised Year 2000 Resource Plan
 - 7.4b. Project Status Reports Section III
- 7.5. Manage Financial Resources
 - 7.5a. Year 2000 Project Status Report (Section IV & V)
 - 7.5b. Updated Year 2000 Project Plan
 - 7.5c. Cost/Schedule Implementation Report
- 7.6. Manage Vendor Contract Resources
 - 7.6a. Year 2000 Project Status Reports (all sections)
 - 7.6b. Updated Year 2000 Control Board
 - 7.6c. Updated Year 2000 Electronic Control Board
- 7.7. Manage Equipment & Other Resources
 - 7.7a. Equipment Management Plan
 - 7.7b. Other Deliverables as Required

- 7.8. Manage Continuous Improvement
 - 7.8a. Continuous Improvement Plans
- 7.9. Manage Project Changes
 - 7.9a. Year 2000 Project Status Report (Section III & IV)
 - 7.9b. Project Impact Statement
 - 7.9c. Request for Proposal (RFP) Preparation
 - 7.9d. Update Year 2000 Project Monitoring System
- 7.10. Maintain Project Documentation
 - 7.10a. Year 2000 Documentation Checklist
 - 7.10b. Year 2000 Documentation Guideline
 - 7.10c. Year 2000 Events Journal
- 7.11. Address Legal and Contract Issues
 - 7.11a. Contract Inventory
 - 7.11b. Year 2000 Contract Language
 - 7.11c. Year 2000 Warranty Language
- 7.12. Address Business Insurance and Liability Issues
 - 7.12a. Year 2000 Business Insurance Review
 - 7.12b. Year 2000 Business Continuation Plan

8. Quality Assurance

- 8.1. Conduct Department/Agency Mobilization QA
 - 8.1a. Department Agency Mobilization QA Assessment
- 8.2. Conduct Detailed Assessment QA
 - 8.2a. Detailed Assessment QA Assessment
- 8.3. Conduct Code Modification QA
 - 8.3a. Code Modification QA Assessment
- 8.4. Conduct Validation QA
 - 8.4a. Validation QA Assessment
- 8.5. Conduct Implementation QA
 - 8.5a. Implementation QA Assessment

- 8.6. Conduct Program Management QA
 - 8.6a. Program Management QA Assessment
- 8.7. Conduct Risk Management QA
 - 8.7a. Risk Management QA Assessment
- 8.8. Conduct Awareness & Communication QA
 - 8.8a. Awareness & Communication QA Assessment
- 8.9. Certify Department/Agency Processes, Procedures and Practice Aids
 - 8.9a. Department/Agency Processes, Procedures and Practice Aids Certification Report
- 8.10. Conduct Process Assurance Reviews and Audits
 - 8.10a. Process Assurance Assessment
- 8.11. Prepare Periodic Quality Assurance Reports
 - 8.11a. Quality Assurance Report

9. Risk Management

Risk Management Initiation Tasks

- 9.1. Identify Key Risks
 - 9.1a. Initial Year 2000 Risk Management Manual with Key Risks Identified
- 9.2. Specify Business Impact of Each Risk
 - 9.2a. Updated Year 2000 Risk Management Manual with Business Impact of Each Risk
- 9.3. Specify a Mitigation Strategy for Each Risk
 - 9.3a. Updated Year 2000 Risk Management Manual with Mitigation Strategy
- 9.4. Specify Early Warning Symptoms for Each Risk
 - 9.4a. Updated Year 2000 Risk Management Manual with Mitigation Strategy
- 9.5. Establish Monitoring Mechanism for Early Warning Symptom
 - 9.5a. Updated Year 2000 Risk Management Manual with Mechanisms to Monitor Early Warning Symptoms
- 9.6. Identify Containment Strategies
 - 9.6a. Updated Year 2000 Risk Management Manual with Containment Strategies
- 9.7. Identify Contingency Plans and Immediate Action Steps

- 9.7a. Updated Year 2000 Risk Management Manual with Contingency Plans & Immediate Action Steps
- 9.8. Define a Triage Planning Process
 - 9.8a. Updated Year 2000 Risk Management Manual with Triage Planning Process
- 9.9. Specify QA Approach and Techniques
 - 9.9a. Updated Year 2000 Risk Management Manual with Quality Assurance Approach and Techniques

Risk Management On-going Tasks

- 9.10. Conduct Monthly Risk Management Assessment
 - 9.10a. Monthly Risk Management Assessment
- 9.11. Monitor Risk Metrics
 - 9.11a. Monthly Risk Management Assessment Metrics Report
- 9.12. Perform Mitigation Actions as Necessary
 - 9.12a. Updated Year 2000 Project Status Reports with Risk Management Mitigation Information
- 9.13. Perform Risk Containment Strategies
 - 9.13a. Updated Year 2000 Project Status Reports with Risk Management Containment Information
- 9.14. Perform Contingency Plans as Necessary
 - 9.14a. Updated Year 2000 Project Status Reports with Risk Management Contingency Plan Information
- 9.15. Perform Triage Process as Necessary
 - 9.15a. Updated Year 2000 Project Status Reports with Risk Management Triage Information
- 9.16. Perform QA Procedure
 - 9.16a. Risk Management Quality Assurance Assessment

10. Awareness and Communication

- 10.1. Identify Stakeholders
 - 10.1a. Department/Agency Stakeholders List

Awareness

- 10.2. Develop Year 2000 Awareness Materials

- 10.2a. Progress and Status Reports for distribution
- 10.2b. Michigan Year 2000 Web Site
- 10.2c. Distribution Lists
- 10.2d. Newsletter
- 10.3. Develop Communications Activities Plans and Schedule
 - 10.3a. Awareness and Communication Activities, Plans and Schedules
- 10.4. Conduct On-going Awareness Programs
 - 10.4a. On-going Awareness Program
 - 10.4b. Increased SOM Year 2000 Awareness

Libraries and Shared Resources

- 10.5. Organize and Maintain Reference Materials
 - 10.5a. Reference Material Library
 - 10.5b. Web Site with Electronic Reference Library
- 10.6. Implement Procedures for "Best Practice" Information
 - 10.6a. "Best Practice" Procedures
- 10.7. Develop Procedures to Exchange Information with Departments/Agencies
 - 10.7a. Procedures to Exchange Information with Departments/Agencies

Status Reporting (High Level and Detailed)

- 10.8. Prepare Periodic Year 2000 Update Report
 - 10.8a. Year 2000 Update Report

Acronyms

AG – Department of Attorney General

AGING – Office of Services to the Aging

CIS – Consumer & Industry Services

CMM – Capability Maturity Model

CORR – Michigan Department of Corrections

DCH – Department of Community Health

DCR – Department of Civil Rights

DCS - Department of Civil Service

DEQ – Department of Environmental Quality

DMB – Department of Management and Budget

DNR – Department of Natural Resources

DOE – Michigan Department of Education

DOS – Michigan Department of State

EXEC - Michigan Executive Office

FIA – Family Independence Agency

IT – Information Technology

LOTT – Michigan State Lottery

MAIN – Michigan Administrative Information Network

MDA – Michigan Department of Agriculture

MDOT – Michigan Department of Transportation

MESA – Michigan Employment Security Agency

MIL – Michigan Department of Military Affairs

MIPC – Michigan Information Processing Center

MJC – Department of Michigan Jobs Commission

MSP – Michigan State Police

OAG – Office of the Auditor General

OCAT – Office of Computing and Telecommunications

OOP – Office of Purchasing

SOM – State of Michigan

SQAP – Software Quality Assurance Program

TREAS – Michigan Department of Treasury

Glossary

Acceptance Testing - Formal testing conducted to determine whether a system satisfies its acceptance criteria and to enable the customer to determine whether to accept the system.

Activity - Any step taken or function performed, both mental and physical, toward achieving some objective. Activities include all the work required to perform the tasks of the project and organization.

Agency – An organizational unit within state government that provide functional services and have Year 2000 compliance responsibility.

Agency Year 2000 Project Manager – This is the person who will manage the day-to-day Year 2000 Project activities of an Agency.

Agency Year 2000 Project Office – For larger more complex Agencies, the organization responsible for completing Year 2000 date related initiatives.

Application System - A bounded set of related components (i.e., components that address a particular type of problem). Examples include payroll and personnel systems, command and control systems, compilers, and expert systems.

Assessment - An appraisal by a trained team of software professionals to determine the state of an organization's current software process, to determine the high-priority software process-related issues facing an organization, and to obtain the organizational support for software process improvement.

Awareness and Communication – Awareness and Communication is a manual within the Michigan Year 2000 Remediation Framework that articulates how the State of Michigan will increase Year 2000 awareness across the State and communicate information such as project requirements, common solutions and project status.

Batch Jobs – A term describing a system that takes a set of commands, executes them and returns the results, all without human intervention. Often there is a queue of batch jobs that the computer system processes, as resources become available.

Best Practice – A collection of tools and techniques that have been determined to be most effective and cost efficient for solving a particular dimension of the Year 2000 Problem. For many languages, for instance – COBOL, there are many tools and techniques that may be used to achieve a similar result. During the course of the project, the best solutions by platform and language will be assembled and reviewed for clarity. After the review, the best practice material will be incorporated in the Procedures and Practice Aids section of the Michigan Year 2000 Remediation.

Bridging – A routine that expands or contracts batch or on-line data files to reconcile data format differences between dissimilar (expanded and unexpanded) data stores in files and programs.

Business Impact of Failure – Defines the business impact of failure resulting from an application system that fails due to a Year 2000 problem.

Business Priority – The order of Business functions at the Agency level after they are evaluated and ranked as to importance regarding the impact of Year 2000 compliance.

Capability Maturity Model (CMM) - A description of the stages through which software organizations evolve as they define, implement, measure, control, and improve their software processes. This model provides a guide for selecting process improvement strategies by facilitating the determination of current process capabilities and the identification of the issues most critical to software quality and process improvement.

Certification – Once a compliance unit has been completely tested, the inventory of components, conversion results, test results, implementation plan and the remediation quality assurance checklist are submitted to the Agency internal quality assurance team for review. These results are then reviewed to validate that the remediated compliance unit is Year 2000 compliant. This process must be performed before assuming any application is century-date compliant. Certification is performed before migration activities for applications that are thought to be century-date compliant and is the final step of the validation process for noncompliant systems that have remediated.

Change Management – The processes required to migrate a new version of production source into a secured environment.

Charter – A document or pronouncement that delineates all responsibilities, authorities, and functions of an organization.

Compliance - An application system or program is in compliance if it properly handles nineteenth and twentieth century dates.

Compliance Unit – A group of related applications, databases, interfaces, or other components that need to be made compliant as a unified group or single release, usually because business or technical considerations require that these applications or components be upgraded and installed at the same time.

Composite Load Modules – A composite load module is a load module that has been constructed from one or more smaller load modules. Typically, a composite load module is constructed from components that are functionally related.

Contingency Factor - An adjustment (increase) of a size, cost, or schedule plan to account for likely underestimates of certain parameters due to incomplete or ambiguous specification, a misunderstanding of the problem, or inexperience in estimating the application domain.

Contingency Plan – A written document that specifies what course of action should be executed in the event that scheduled tasks or activities are not completed as planned.

Continuous Improvement – The process that will be used to 1) identify opportunities to improve the Year 2000 processes in use; 2) to modify the Year 2000 processes; 3) to implement the modified Year 2000 process; and 4) to monitor the results of the refined Year 2000 process.

Conversion Program – A program that is written to convert a file or database from one format to another format.

Cooperative Vendor Contract – Agreement with software vendors to provide Year 2000 Project services during a specific timeframe, for a specified number of people, at a certain rate.

Copy members/copies/includes/include members – Common “COPY” code that is pulled into a program during a compile.

Custom Date Patterns – A list of data element name patterns that represent unique references to date data elements that are not part of the standard list. (e.g., in the automobile industry, the part number field may have embedded in it a date – used for safety recall processing).

Data Conversion – The process of remediating data files and databases so that the remediated programs may execute properly.

Data files/data stores/databases – Collections of information having similar characteristics represented as electronic data stored in computer media such as disk, tape or CD-ROMs.

Date Element – Data element with a name that has a pattern that would indicate that the data element is a potential date element.

Debugging-Aid – a tool, usually a software proprietary computer program, used to examine source program code for errors.

Defect - A flaw in a system or system component that causes the system or component to fail to perform its required function. A defect, if encountered during execution, may cause a failure of the system.

Organizational units within state government that provides functional services and have Year 2000 compliance responsibility.

Fallback Plan – During implementation, there is a risk that a compliance unit that has been implemented will fail. Therefore, prior to implementing a compliance unit, an implementation and fallback plan will be developed. The implementation should contain detailed information about the implementation. The fallback plan should contain detailed information about how to remove a compliance unit from production. The plan will include detailed fallback procedures for every batch job, transaction, executable, and data file implemented.

Field Expansion – The revision of date elements to accommodate century digits in a date field.

Filter – A program that reads date in its current form and converts it into a meaningful format based on a sliding scale.

Goals – Goals are used in the Capability Maturity Model (CMM) to establish a benchmark from which to measure continuous improvement.

Implementation Plan – A written document that defines the approach, activities and tasks that are to be completed to implement a renovated compliance unit. The implementation plan includes a complete list of the organizational as well as system changes that will be completed.

Implementation Priority Sequence – The order the application systems will be renovated/replaced/implemented.

Implementation Strategy – Development of an approach that defines the steps required to implement Year 2000 project compliance units.

Infrastructure – In the context of the Michigan Year 2000 Remediation Framework, infrastructure refers to such items as: mainframes, mid ranges computers, device controllers, communications equipment, operating system software, hard drives, scanners, tape drives, cartridge drives, printers, WANS, LANS, servers, desktop hardware, desktop packaged application software, network switching equipment, telephones, building infrastructure systems, etc.

Integration – On-line real-time databases or flat files shared between multiple applications.

Inter-Agency – Year 2000 project efforts and activities that are shared among SOM Agencies.

A shared boundary across which information is passed. A hardware or software component that connects two or more other components for the purpose of passing information from one to the other.

Inter-system Testing – A process whereby an integrated group of programs within multiple systems are tested to determine if they work properly together.

Inventory Assignment – A process to assign a job/transaction/program to an application system/subsystem within an Agency.

Inventory Packaging – A process to prepare each application system for detailed assessment and renovation.

Inventory Packaging Questionnaire – A questionnaire to be completed by Agency personnel to collect information about an Agencies' detailed application inventory. The questionnaire will be used to assess what difficulties will be encountered while building a detailed level inventory of software components.

Keane, Inc. – The vendor that conducted the SOM Year 2000 Assessment.

Life Cycle - The period of time that begins when a software product is conceived and ends when the software is no longer available for use. The software life cycle typically includes a requirements design, detailed design, construction, test, installation and production.

Maturity Level (Initial; Repeatable; Defined; Managed; Optimized) - Part of the Capability Maturity Model, a well-defined evolutionary process for achieving a mature software development and maintenance process. The five maturity levels in the Software Engineering Institute's Capability Maturity Model (CMM) are:

Initial - The software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort.

repeatable - Basic project management processes are established to track cost, schedule, and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.

defined - The software process for both management and engineering activities is documented, standardized, and integrated into a standard software process for the organization. All projects use an approved tailored version of the organization's standard software process for developing and maintaining software.

managed - Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.

optimizing - Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

Methodology - A detailed approach, containing generic and tool-related step-by-step guidelines for developing, upgrading, improving, or replacing application systems to be Year 2000 compliant. Often the term Methodology refers to the Michigan Year 2000 Remediation Methodology.

Metrics- A standardized way of measuring some attribute of the software process. Examples of these attributes are size, cost of defects, communications, difficulty, and environment.

Michigan Year 2000 Project Office - The core IT project team that coordinates century-date compliance projects across the State of Michigan.

Michigan Year 2000 Remediation Framework – SOM has implemented the Michigan Year 2000 Remediation Framework, a series of programs designed to build a common vision for addressing the Year 2000 challenge and to establish procedures and processes with which to manage the Year 2000 challenge. The five components of the Michigan Year 2000 Remediation Framework are: Volume 1 – Michigan Year 2000 Remediation Methodology; Volume 2 - Year 2000 Program Management Guide; Volume 3 – Year 2000 Software Quality Assurance Program (SQAP); Volume 4 – Risk Management Program; and

Michigan Year 2000 Remediation Methodology – A detailed approach that has been customized for the State of Michigan, containing generic and tool-related step-by-step guidelines, for developing, upgrading, improving, or replacing application systems to be Year 2000 compliant.

Migrate/Migration - The process of promoting approved Year 2000 source code components back into production.

Milestone - A scheduled event for which some individual is accountable and that is used to measure progress.

Mitigation Strategy – Development of an approach, technique or plan to relieve or reduce a given risk.

Mobilization – The process of initializing SOM resources to address the Year 2000 challenge.

Newsletters – Publications for SOM Year 2000 participants for reporting activities and other news worthy events regarding the Year 2000 project.

Object Modules – Computer programs that have been assembled or compiled from source code into machine language.

Office of the Auditor General – The Office of the Auditor General for the State of Michigan provides for the audit and reporting of Agency activities.

Operating System Software – A set of electronic instruction that controls all processes (input/output, logic, and memory control) of a computer system.

Platform - The foundation technology of a computer system which is typically a specific combination of hardware and operating system software.

Policy - A guiding principle, typically established by senior management, that is adopted by an organization or project to influence and determine decisions.

Post Implementation – A project activity that involves the review, support and monitoring of project results for compliance after the implementation phase has been completed.

Potential Date Elements – Data elements that are identified by analytical tools using pattern-matching techniques that are unconfirmed date data items.

Practice Aids – A collection of detailed instructions defining the activities and tasks that need to be performed to renovate an application system for the change-of-century. An index of the Procedures and Practice Aids and a copy of the Procedures and Practice Aids may be found at the end of the Michigan Year 2000 Remediation Methodology.

Procedure - A written description of a course of action to be taken to perform a given task.

Process - A sequence of steps performed for a given purpose. For example, the software development process.

Process Assurance – Quality Assurance under the Software Quality Assurance Program (SQAP) has two components -- *Process* and *Product* Assurance. Process Assurance is a verification of the processes used to conduct Year 2000 remediation, and is performed by the Michigan Year 2000 Project Office. The Michigan Year 2000 Remediation Methodology is used as a benchmark to validate that the Agency is following and completing each Year 2000 project according to a common established standard. Process Assurance is conducted using the Capability Maturity Model (CMM) as a framework.

Product Assurance - Quality Assurance under the Software Quality Assurance Program (SQAP) has two components -- *Process* and *Product* Assurance. Product Assurance is a verification of the products that are generated during the remediation of an application system. The Michigan Year 2000 Remediation Methodology is used as a benchmark to validate that the Agency is following and completing each Year 2000 project according to a common established standard. Product Assurance is conducted using the IEEE Std 730.1-1989 as a framework.

Production Promotion – The process of promoting approved Year 2000 source code components back into production.

A responsibility for managing a particular program, including the responsibility, authority, and accountability for program cost, schedule performance, status, and risk.

Project - An undertaking requiring concerted effort that is focused on developing or maintaining a specific product. The product may include hardware, software, and other components. Typically, a project has its own funding, cost accounting, and delivery schedule.

Project Planning Template – A guideline or model used by Agencies that summarize a description of a task, lists deliverables to be produced, and the roles responsible for performing each task.

Quality Assurance - (1) A planned and systematic pattern of all actions necessary to provide adequate confidence that a software work product conforms to established technical requirements. (2) A set of activities designed to evaluate the process by which software work products are developed or maintained.

Regression Testing – A process executed to validate that an application system performs as before with only anticipated differences. Regression testing is performed by executing both an original source test and a revised source test against the same data, validating that the results are the same with the exception of anticipated differences.

Remediate/Remediating/Remediation – The term remediate, remediating and remediation are used to describe all of the activities required to enable the State of Michigan's application systems to be Year 2000 operable. Renovation, Replacement, Rewrite, Retirement, and Verification are Remediation Strategies.

Renovate/Renovating/Renovation - A year 2000 conversion strategy in which code that is not year 2000 compliant is located, modified, and verified to ensure year 2000 compliance.

Replace - Substitution of a non-compliant existing program or application with a version of the software that is year 2000 compliant.

Rewrite - In a limited number of instances, the functionality provided by an application may not meet the needs of the State at all, and the agency may elect to rewrite the application. This is a risky strategy because of the inherent problems associated with development projects.

Retire - A conversion strategy in which resources that are not year 2000 compliant and are no longer deemed necessary, are systematically and permanently removed from the production environment.

Verify for Compliance - If an application has already been determined to be compliant, the State of Michigan will need to test the application to document compliance.

Remediation Strategy (Windowing/field expansion)- Identification of an approach for renovating dates in an application system.

Renovate/Renovating/Renovation – A Year 2000 conversion strategy in which code that is not Year 2000 compliant is located, modified, and verified to ensure Year 2000 compliance.

Replace – Substitution of a non-compliant existing program or application with a version of the software that is Year 2000 compliant.

Retire – A year 2000 conversion strategy in which resources that are not Year 2000 compliant and are deemed no longer necessary are systematically and permanently removed from the production environment.

Risk - Possibility of suffering loss.

Risk Management – Risk Management is a manual within the Michigan Year 2000 Remediation Framework that articulates how the State of Michigan will manage the Year 2000 risks across the State.

Role - A unit of defined responsibilities that may be assumed by one or more individuals.

Route/Disposition – The path each application system or subsystem will undergo during the Year 2000 remediation process. Possible selections are renovate, replace, retire, verify or n/a.

Scanning – The process of automatically or manually scanning an application system. Information from the scan is stored in a repository that captures the relationships between various system components (e.g., program to copy, program to call).

Search Engine – A technique used to scan large volumes of data in a computer environment to locate and isolate specific information based on key word input.

Smart Bridge – A technique used to interrogate the structure of a file or database to determine what format the data is in. Once determined, the data is returned to the program for processing.

Software Factory – An automated Year 2000 Assessment and Remediation facility located at MIPC.

Software Quality Assurance Program (SQAP) - (1) A planned and systematic pattern of all actions necessary to provide adequate confidence that a software work product conforms to established technical requirements. (2) A set of activities designed to evaluate the process by which software work products are developed or maintained.

Source Code Baseline – A point-in-time backup for all the source code that will be changed during the course of the Year 2000 project.

Spectrum Consulting Group, Inc. – The Software Quality Assurance Program Vendor.

Stakeholder – A person, Agency, or business unit that has an interest or will be impacted by the Year 2000 Project.

Standard Date Patterns – A list of date related data element name patterns commonly found in program source code.

Statewide – A term used to define all parts of or throughout the State of Michigan.

Step – An action, proceeding, or measure that occurs as one of a series as defined in the Year 2000 Project Plan.

Subcontractor - An individual, partnership, corporation, or association that contracts with an organization (i.e., the prime contractor) to design, develop, or manufacture one or more products.

Subject Matter Expert (SME) – An individual with business or technical knowledge about an application.

Subsystem – A subset of the system components in an application system.

System testing – Testing that demonstrates adherence of a complete system to functional specifications, usability requirements, system integrity requirements, and integration with external systems and procedures.

Task - (1) A further breakdown of an activity with a beginning point and an ending point. (2) A collection of related steps within a methodology that contains objectives, entrance criteria, rolls/skills, inputs, tools support, deliverables, quality checks, metrics, exit criteria, and generic and tool-based guidelines.

Test Data Distillation – During the Year 2000 testing process, an extremely large amount of testing will be performed. A test distillation tool distills the test data into a minimum set of test data required to achieve the same percentage of test coverage.

Test Script Development – For on-line systems, test data is secured, and test plans are developed depicting the nature of each test, with test values scripted so that on-line testing may be performed in a repeatable and predictable manner.

Testing Environment – Prior to implementing a compliance unit back into production, an application program is tested in several of the following testing environments:

- Unit Testing/Regression (multiple cycles).
- System.
- Inter-System.
- Stress.
- Acceptance.

Tools - A software product that automates a portion of the effort required by the Year 2000 project.

Trading Partners – An external Agency, vendor, or regulatory agency with which an Agency shares data.

Transaction – Function which is performed in an on-line processing environment.

Transition Environment – Implementing all applications simultaneously is impractical. As a result, transactions, programs, jobs, and other executables are broken down into implementable pieces called compliance units. Compliance units that share data may not be able to be implemented together as a result of schedules, people constraints, etc. In those instances where two related compliance units are not implemented at the same time, bridges, filters, and file conversion utilities will need to be implemented in production. The collection of bridges, filters and file conversion utilities are considered the transition environment required during the period between when the first compliance unit and the second compliance unit is implemented.

Triage – A Year 2000 strategy where applications are ranked by strategic importance and decisions made regarding which application are allowed to fail if the organization cannot to complete its century-date compliance project on schedule.

Unit Testing – A test procedure whereby individual program modules are tested for Year 2000 compliance without consideration for other related program modules or subsystems.

Validation - The process of evaluating software during or at the end of the development process to determine whether it satisfies specified requirements.

Vendor Supplied Application Software Package (VSASP)- Application software that has been purchased and implemented and for which a new Year 2000 compliant release is available.

Vendors – Supplies or manufactures computer hardware, software, or services provided to the SOM.

Used in the context of Risk Management — a measurable factor that may be monitored to determine whether or not the State should become concerned about a specific Risk Factor.

Web Site – A location on the Internet to provide information in an electronic multimedia format.

Windowing – A renovation option. Windowing does not require that the physical data of the application system change, thus reducing the costs and risks associated with file conversions. Procedural statements are inserted in the source to interpret the century based upon a breakpoint. If a breakpoint of 30 is used, a year of 29 that is less than 30 would be interpreted as a 21st century date – 2029; a year of 31 that is greater than 30 would be interpreted as a 20th century date – 1931.

Work Break Down Structure – The process of breaking a project down into finer and finer levels of detail so that the work may be more easily performed and managed.

Year 2000 Assessment Report – An appraisal by a trained team of software professionals to determine the state of an organization's current software process, to determine the high-priority software process-related issues facing an organization, and to obtain the organizational support for software process improvement.

Year 2000 Compliance Criteria – Consists of guidelines that define what is required to accurately process date data, including calculating, comparing, and sequencing, from, into, and between the twentieth and twenty-first centuries, including leap year calculations.

Year 2000 Emulation – The operating systems for most platforms keep a date and timestamp internally. To test for compliance, the system date and timestamp must be artificially moved forward to the proper time, the tests performed, and the date and timestamp reset back to the current date and time. Year 2000 Emulation tools have the ability to intercept requests from the application program for a system date and return a date back to the program for whatever date is required by the test case.

Year 2000 Progress Reporting System – This is a software computer program designed to collect data from the Agencies so that the Michigan Year 2000 Project Office can monitor and report on SOM Year 2000 project initiatives.

Year 2000 Implementation Strategy Plan (ISP) – This is a written document that sets forth the direction that each Agency will follow to become Year 2000 compliant.

Year 2000 Program Director – This is the person who has total responsibility for the Michigan Year 2000 Project Office.

Year 2000 Special Interest Group – State government officials with an interest in the Year 2000 Project can become a member of the Year 2000 Special Interest Group (SIG). The purpose of this group is to receive input from the perspective of an Agency to review the Software Quality Assurance Program (SQAP), the Michigan Year 2000 Remediation Methodology and other Michigan Year 2000 Project Office initiatives.

Year 2000 Task Force – A committee founded to investigate the feasibility of forming a Year 2000 Project for the State of Michigan.

